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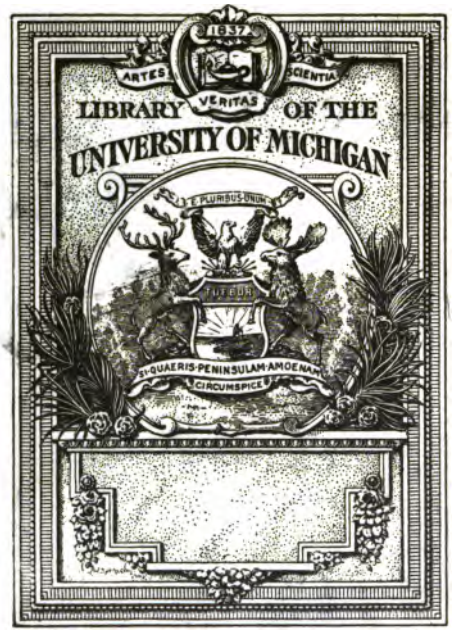
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MAN
IN THE LIGHT OF
EVOLUTION

MAN
IN THE LIGHT OF EVOLUTION

BY

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PREFACE

ALMOST fifty years ago Mr. Darwin published the "Origin of Species." His "Descent of Man" followed some years later. A host of books have since been written on evolution, Darwinism, and natural selection. But comparatively few zoölogists have attempted to show the bearing of the theory of evolution on man's history, progress, and life. They have generally left this problem to the sociologist and archæologist.

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This need not surprise us. All problems of life are exceedingly complex. Nature is, or seems, very illogical. Why, then, attack the problem in its most difficult form in the highest and most complex living being until we have gained an approximate solution of the questions involved in the life of the lower and simpler? The zoölogist wisely hesitates before the difficulties of the attempt.

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his kingdom has injured the zoölogist in many ways. If man is the product of evolution, and all life belongs to one grand series, though with many branches, the lower and incomplete manifestation should be viewed in the light of man's structure and powers as well as the converse. Failure to recognize this truth has sometimes made our science one-sided and narrow.

Meanwhile many have discussed the evolution of family, society, morals, and religion who have not fully recognized the complexity of the problem. Some have looked at man entirely in the light of lower animals, almost as if he were a mere clam or worm, and have formed theories of human evolution adequate only to these lower forms. We have had many "gladiatorial theories" in spite of Professor Huxley's warning. Others, recognizing more clearly man's unique position, have practically discarded all laws of evolution applicable to lower forms. Some such writers have almost neglected the power of natural selection.

The great body of thinkers and workers have little interest or care for facts or theories of zoölogy which do not seem evidently related to human life. The anatomy of worms and the

number and structure of chromosomes unfortunately does not appeal to them.

Hence many, seeing the diversity of theories of evolution, find little in any of them which is clear and sure and of practical importance. It is too academic for their tastes. Hence we hear of the inadequacy, decline, or failure of Darwinism, or even of evolution. Even when Darwinism is not denied, it is often not accepted with the cordiality and enthusiasm which it deserves. The " splendor of truth " has not been recognized as widely and clearly as it should be.

In presenting this brief study of " Man in the Light of Evolution " I am well aware of the difficulties and hazard of the attempt. Questions of great complexity must be handled in a few pages. Many very important theories must be neglected, if one would present the subject to those who have made little or no special study of zoölogy. And this attempt is made chiefly for the benefit of lay readers. The multitude of trees must not be allowed to hide the forest —to borrow a German proverb.

I have attempted to mark out a straight, if somewhat narrow, path through the forest, and one which leads to some of the most important

viewpoints from which a wide outlook may be gained. I hope that some may be tempted to explore more widely by the aid of the brief bibliography at the end of the volume. The subject is surely worthy of our closest attention and thought.

I make no apology for emphasizing throughout the study the importance of the moral and religious powers, as well as of social and family life. These are the most marked and important human characters. To leave them in the background of any study of man is to present the play of "Hamlet" with *Hamlet* left out.

I have viewed animals and men more from the physiological than from the anatomical standpoint. Much is said of functions, powers, actions; less of organs and structure. I know neither the location nor structure of the organ of fellow-feeling or hate, of morals or religion, and of many other mental powers, provided they have a special center in the brain. A first or second association area even does not help a great deal here, though I would be the last to undervalue Professor Flechsig's great work. And yet we must talk of these powers.

One who does not believe in the inheritance of

acquired characters may say: Effects of use and disuse, of habit, are not inherited, and have no value or effect in evolution. But use and disuse—in one word, habit—always accompany a certain environment, and make life possible or successful only under certain surroundings or conditions. Habits and conditions thus modify the trend and direction of natural selection, and favor the survival of any form having a congenital, structural variation useful to the possessor of the habit. To judge from the writings of the Neo-Darwinians, congenital variation in a certain direction may always be relied upon to occur when needed. It is a very present help in all times of trouble.

The primitive vertebrate, to use only one illustration, had been driven from the bottom by stronger competitors, and was compelled to maintain a swimming habit. His environment was totally different from that of the animals creeping on a sea bottom rich in food but crowded with competitors of every kind. As the swimming habit was necessary, natural selection would repress all tendencies toward an external skeleton as long as it could hinder this form of locomotion. Its appearance later in

ganoids does not concern us here. On the bottom the external skeleton would be fostered. Here, as in most cases, though perhaps not in all, habit and natural selection work together toward the same goal. The one can accomplish what the other may not do. The Neo-Lamarckian recognizes the value of both habit and structure; the Neo-Darwinian will not deny this action and tendency of selection.

While writing the book I have been continually reminded of pleasant moments passed in discussing these and other questions with pupils of successive classes. If the book has any value, a large part of it is due to the stimulus of their interest. If it can arouse something of the same interest, and now and then a healthy opposition in other minds, I will be more than content.

J. M. T.

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MAN IN THE LIGHT OF EVOLUTION

CHAPTER I

DARWINISM

LESS than fifty years ago Mr. Darwin published the "Origin of Species." But the idea of evolution was well known by Greek and Hindu philosophers who lived more than two thousand years before. Aristophanes, apparently quoting from some far older writer, says: "Chaos was and night, and Erebus black and wide Tartarus. No earth nor air nor sky was yet, when in the bosom of vast Erebus (chaotic darkness) winged night brought forth first of all the egg from which in after-revolving periods sprang Love, the much desired, glittering with golden wings. And Love again, in union with Chaos, produced the breed of the human race."

Here the process by which higher forms are

produced from lower is a birth, not a creation. It is evolution pure and simple. Says Professor Lewis: "According to the ancient view the present world was a growth; it was born, and came from something antecedent, not merely as a cause but as its seed or embryo. Plato's world was a living being, a natural production." [1]

The idea of origin by birth from some preceding form, and this is the essential idea of evolution, was perfectly natural and reasonable to the writers of the Bible, and apparently to all ancient Oriental thinkers. They speak of the "generations of the Heavens and the Earth" as of the generations of the patriarchs. The writer of the ninetieth psalm says: "Before the mountains were born, or ever thou hadst brought to birth the earth and the world," if we translate his words literally. Here we have side by side the thought of a primal creation and of later evolution. The mind of these ancient thinkers was broad enough to conceive of both these processes; we are prone to overemphasize one to the exclusion of the other.

[1] Lewis, Tayler, "Six Days of Creation," Chapter XXIV.

Similar views were held by the church fathers. Augustine speaks frequently of the laws of nature.[1] By these he explained the phenomena of the physical world, not by constant divine interventions. He distinguishes sharply between the work of creation and that of formation or development. The former was direct and simultaneous, the later gradual and progressive, according to the laws of nature. He says that animals and plants were produced, not as they now appear, but virtually and in germ. All things were created originally in an elementary condition and developed and assumed their present form subsequently "according to opportunity." Other even more striking passages might easily be quoted from this old evolutionist.

The earth was to all these men no mere clod or mass; it pulsated with life, brought forth of itself, and responded to divine commands or influences. In all the wheels of nature there was a true spirit of life, while above was the firmament and the throne.

In the seventeenth century Suarez in Spain and Milton in England propounded the theory

[1] Osborn, H. F., "From the Greeks to Darwin," p. 71.

of the immediate creation of distinct species. I can find no clear statement of the theory before this time. Hence Mr. Huxley has rightly called it the Miltonic hypothesis. In the eighteenth century it was adopted by Linnæus and generally accepted by the scientific world. Early in the nineteenth century Lamarck, a French naturalist, attempted to prove that new species could arise from old ones by gradual changes resulting from the use and disuse of organs. But his theory was crude and capable of but limited application. It gained few adherents and little attention at the time. Conditions were not yet ripe for the return of the theory of evolution.

Thus Mr. Darwin was far from being the first to discover the theory of evolution. His great and difficult work was to put the old metaphysical theory on a sound scientific basis, and to prove that evolution was not only attractive and creditable but reasonable and practicable. He had to show how and why one form could slowly and gradually change into another of higher and more complex structure, or sink to a lower grade of life. Our first need is a simple and clear outline of his theory.

There is hardly a more interesting chapter in

zoölogy than the history of our domesticated plants and animals. Many of them, like our fowls and pigeons, are almost certainly descended from one original wild species. Yet under domestication there has arisen a great number of races or breeds so different that, were they wild, we should not hesitate to refer them to distinct species or genera. Not only color and form of feathers, but even the skeleton, as well as the muscles, have been modified. Mr. Darwin says: "Breeders habitually speak of an animal's organization as something quite plastic, which they can model almost as they please. . . . Sir John Sebright used to say with respect to pigeons that he would produce any given feather in three years, but that it would take him six years to obtain head and beak."

The breeder depends for his success on three facts. The first is the law of heredity—like begets like. If the parents are peculiar in some respect, some of their children will inherit this peculiarity enhanced, in others it will be less marked. The second fact is the law of variation. The offspring is probably never exactly like either parent, and no two of the descendants of a single pair are identical. But the variation

in a single generation is usually slight. Only as these slight variations are accumulated from year to year, is any marked change or improvement perceptible.

Thirdly, the success of the breeder in accumulating these slight variations depends upon his skill in selecting those individuals which have the desired characteristics most marked, and allowing only these to breed. This process of selection must be kept up for years. But, if skillfully applied under favorable conditions, excellent results are almost sure to follow. The superiority of the Saxon wool was due very largely to the careful examination and selection of the sheep by trained experts. The size of fruits, the speed of the trotting horse, the amount of milk or cream produced by cows, the number of eggs laid by fowls, the value, the beauty, and in some cases the ugliness, of dogs—all these characteristics have been marvelously increased by the same process.

The laws of heredity and of variation apply equally well to domesticated and to wild animals. Wild animals probably vary somewhat less than domestic. But even here variations are more frequent and often more marked than many

of us suspect. To cite only one familiar instance: The examination of any bundle of fox skins on a dealer's counter or in a trapper's pack will often reveal marked variety in color, fineness, and other respects. Variations occur also in deep-seated structures—bones, muscles, and even nerves—as well as in the superficial covering of the body.

Mr. Darwin had to seek for some force, process, or tendency in nature which would work in wild animals a selection somewhat similar to that practiced by the breeder among domesticated forms. If he could find this, he had every reason to believe that their slight variations would gradually accumulate sufficiently to give rise to new species or genera, or even larger groups. Any slight incompleteness in the natural process would only make the accumulation proceed more slowly; it would not arrest it completely. Thus the central thought of Mr. Darwin's theory is that of a Natural Selection. This process is the necessary result of the struggle for existence.

All living species tend to increase in geometrical progression. If a pair of birds producing four eggs should breed only once in a lifetime and all should survive, the number of individ-

uals would double in each generation. Frogs produce several hundred eggs at each spawning; fish, thousands or even millions. The insect lays several hundred eggs. If of all these eggs only two produce mature individuals, the number of the individuals in the species will be maintained. Most species of plants or animals remain about as common or rare one year as another for long periods.

Sometimes an insect, like the currant worm or potato bug, escapes from a territory where food is limited and enemies abound to a region of fewer enemies and abundant food. It multiplies and swarms, a devastating pest. But animals which feed upon it or parasites which live in it are also benefited. They increase with equal or greater rapidity. Finally they become sufficiently numerous to subdue it or to keep it within bounds. The great and rapid increase has been due to surrounding conditions favoring survival of young, far more than to any increase of reproductive power. If all the young of even the most slowly reproducing animals could survive, there would not be standing room for them on the globe after a few centuries.

Let us suppose that a certain insect produces

only one hundred eggs, a number below the average for this group. The young from only two of these will probably survive to maturity. If three can survive there will be fifty per cent more of the descendants of this individual than of the average. If the species is common, some fifty thousand of the young will compete for survival in a certain area. But where one survives forty-nine perish.

If two men picked by lot from the young people of a town run a race, the winner may lead by several yards or even rods. If ten run, the finish will be closer. If one thousand run, the distance between the first and the second man will probably be only a few inches. An atom more of muscle, wind, endurance, or pluck will often give the prize.

The fifty thousand young or eggs of our insect species are like the runners in the race. Only one thousand can survive. The finish will be very close. Some of the young have inherited from their ancestors a slight peculiarity, which gives them a very small advantage. It is thinkable that of these, four out of each hundred might survive in each generation instead of two. If this rate could be maintained for four or five

years the individuals possessing this peculiarity would become very numerous, and the descendants of less favored individuals would be outnumbered, if the number of survivors in the whole species remained constant. So great an advantage would very rarely occur. But it is evident that the very slightest advantage continued from year to year would markedly increase the number of individuals attaining maturity. Any continued change in conditions will favor the survival of descendants of forms whose individual characteristics are best adapted to the new surroundings. In the long run those best adapted to their environment will survive and develop, attain maturity, and hand down their characteristics to the largest number in the next generation. The rest will die at various stages of immaturity and be prevented from breeding.

It is evident that there is and must be a universal process of natural selection corresponding to the artificial selection of the breeder of domestic animals. This process tends to accumulate variations from generation to generation. Its results will probably be far slower and more gradual than the breeder's artificial selection, but for the same reason they may be more sure and

permanent. It will result in the "preservation of favored races in the struggle for life," and in conformity to environment in the resulting species or larger groups. Only the fittest can survive.

Viewed as a hypothesis, Mr. Darwin's argument is clear, logical, and irrefutable. Will it work? Or is it only a plausible conjecture? Mr. Darwin spent twenty years in applying and testing his theory before he published a word on the subject. He made a most careful study of all the literature. He experimented on pigeons and seedlings, on anything and everything which could throw light on the question. He consulted with the wisest and most careful observers and students. He had a marvelously calm, fair, judicial mind, devoid of all prejudice. In accepting evidence he was cautious almost to a fault.

In 1859 he published "The Origin of Species." He packed the experience and thought of a lifetime into one small volume. It is terribly condensed and hard reading. But it is a marvelous result of deep and wide study logically expressed. No one has ever surpassed him in clearness and fairness of statement of the ob-

jections to his theory. He gives them all due weight and attention.

The book met a quick and favorable response from students of science. It was anything but popular in style and tone, and it is not surprising that the general community was slow to apprehend its true meaning and bearing. It was often misunderstood, and the theory has frequently been misstated. Long study, much experience, and great patience were needed for a proper appreciation and understanding of its arguments. Misunderstanding resulted in false inferences. Prejudice was aroused. Discussion often resulted in more heat than light, and zeal was often greater than knowledge. Gradually the misunderstandings were explained, heat abated, a fair comprehension and appreciation of the theory followed, and now its main features have received almost universal acceptance.

It is impossible and unnecessary to find place here for the arguments for and proofs of the theory. They can be found stated clearly and at length in many books.[1] But the relation of the

[1] See Bibliography.

theory to our system of classification demands attention.

The systematic naturalists who had long studied the classification of living and extinct animals generally accepted the theory readily because it gave a clear and satisfactory answer to the questions which their work had raised in their minds. The classification of the animal kingdom had been plotted so as to bring together like forms and to separate unlike. The great groups, like classes and orders, had been based on deep-seated characters, which changed slowly. The minor subdivisions, genera and species, were characterized by more superficial traits which might easily be modified. It was soon found that all animals could not be arranged naturally in one line or series, but that the classification must take the form of a tree with many branches.[1] It had long been recognized that the oldest members of each great division were generalized—that is, they combined characters which in later forms were found only in separate classes or orders. The oldest amphibia

[1] See Appendix, Charts; cf. Cope, E. D., "Primary Factors of Evolution," Chapter II.

were much like fishes, and did not bring out clearly and sharply the amphibian characteristics. The oldest bird, Archæopteryx, had the teeth and long tail of a lizard. The lowest, and probably the oldest, mammals laid eggs, like reptiles. Such a generalized or comprehensive form was placed by common consent at the bottom of its line or branch. Specialized forms, which brought out more distinctly the characteristics of the group, were placed at the ends of branches. Finer branchlets and twigs represented the genera and species.

According to Mr. Darwin's theory this tree of classification was a genealogical tree, similar to that which might be made of the members of any family, with the oldest known ancestor at the bottom and the living members at the end of the branches. The relation between successive groups along each branch was that of descent with modification.

Deep-seated characters had become fixed in some remote ancestor and been handed down to all his descendants. Superficial traits naturally characterized the more changeable species. Generalized forms stood at the base of each branch, because their descendants were continually be-

coming more specialized as they became more completely adapted to their own special environments, their limited place and range of conditions. Such a genealogical tree must show the order of geological occurrence just as a human genealogical tree must show the succession of generations in the family.

The theory offered the only reasonable explanation why the tree showed the order of succession, and something concerning the character, of embryonic stages. It explained von Baer's and Agassiz's discovery that higher forms during embryonic life passed through stages or conditions of structure which remained permanent in the adults of older and lower groups on the same line or branch.

The fowl in its early embryonic life passes through a stage where it has many of the structures of a fish, and later another with reptilian characters. Why is this? The first living beings were minute masses of living substance or protoplasm, each mass containing a central spherical body—the nucleus. These single cells or unicellular animals gradually formed groups of cells, and from these again, after a long time and with many intermediate stages, wormlike

forms were evolved. Out of the worm the first fish was developed, and from these primitive amphibians and reptiles were evolved. Birds came from a branch of the reptilian line. These are only a few of the stages through which birds were slowly evolved from unicellular animals through long ages.

The fowl, like every living being, comes from an egg. The essential part of every egg is a single cell. A very large part of the yolk of a bird's egg and all the white is merely food to support the growing embryo. Out of it the organs must be builded and the energy furnished for the long embryonic march or journey.

How does the egg cell ever find its way through this long march? How does it manage to mold a body, frame a skeleton, stretch the muscles, spin the marvelous cobweb of the nervous system, and build a brain? If we had not seen it happen so many times, we would never believe that a chicken could be hatched out of such a thing as an egg.

This much would seem to be clear. The only way in which the single cell of the egg can find its way to, or succeed in building such a body, is by an inherited tendency or impulse to follow

the same line which all its ancestors have traced and lengthened from earliest time to the day when the fully developed fowl appeared. It must pass successively through vermian, fish, and reptilian stages. It is not the straightest line of development, but it is the most natural and perhaps the only possible. If the evolution theory be true, it is to be expected that ontogenesis or the embryonic development of the individual will recapitulate phylogenesis, the evolution of the species or larger group.

But ontogenesis, or embryonic development, occupies a few days or months. Phylogenetic, or racial development, required ages. The embryonic development must be hastened as much as possible. Stages which can be slurred over or crowded out will gradually disappear. Short cuts will be taken wherever possible. The recapitulation will not be complete or exact. But certain stages will reappear with great clearness.

This general parallelism between the development of the race and that of the individual has always been rightly emphasized as one of the strongest possible arguments for the truth of the theory. It is quite inexplicable by any other theory. The geological succession is a second

argument. The facts of geographical distribution all point in the same direction. Mr. Darwin gave a firm scientific basis to the old metaphysical theory of evolution.

The theory has been considered by some as harsh and cruel because it is based upon the struggle for existence. The struggle for existence, the battle and carnage in nature, is a fact, explain it how you will. The believer in immediate creation of species had to face the fact that hosts of carnivorous forms throughout the animal kingdom preyed upon their weaker fellows. He believed that all life on the globe, good and bad alike, had been repeatedly completely exterminated by convulsions of nature. He had seen everywhere proof of extinction of species independent of these convulsions. The evolutionist sees good coming from all these processes. The believer in immediate creation had no explanation to offer.

Life always has been, and always must be, an experiment. The animal had to feel its way to higher structure. At every stage thousands of experiments had to be tried before the next higher stage was successfully attained. Most of the experiments failed or were only partially

successful. Nothing else was to be expected. At every stage of the march the advancing host spread out, seeking the right upward road. Many promising roads led to impassable barriers, or to the Sloughs of Despond or of Contentment. A few blazed the upward way. It was an expensive process, but it insured final success. It would be difficult to discover a better process under the conditions of the experiment.

The struggle for existence among animals is severe, but it is not as harsh and cruel as the struggle for wealth and comfort among men. The biological arena is far less cruel than Wall Street. Mr. Darwin uses the phrase in a very broad and often metaphorical sense. Animals and plants struggle mostly with their physical surroundings, cold and heat, rain or drouth, with enemies and hardships of the most various kinds.

Young animals starting in life are like a host of young men going out into the world to seek their fortunes. Some of these young men fail at the very start for lack of physical stamina and endurance, or because utterly devoid of business ability. Competition becomes sharp only

between a comparatively few of the most successful. Even here the competition does not usually take the form of physical violence.

The cases where individuals of the same species actually fight to crowd one another out are few. Competition for food may be severe, but there is generally enough for all. Few actually starve except in hard seasons. The fact that many are born and few survive is evident. Natural selection is sure. In a sense there is wholesale competition for life. But we do not yet clearly know the exact form of this competition, the laws of the great game. Mr. Darwin is wisely very cautious in his statements on this point, and we may well follow his example.

Even this competition is always diminished by the divergence of species. They are continually seeking new places and conditions in nature where the pressure will be less severe.[1] They become accustomed to new kinds of food, disperse from one region into another of different conditions. Every great group tends to spread, to occupy larger fields, and to try new experi-

[1] Osborn, H. F., "Adaptive Radiation," Amer. Nat., vol. xxxvi (1902), p. 353.

ments. This tends to diminish the competition between members of the same group, but rather increases it between different groups, though even here the competition is less direct and keen.

"Nature is no fairy godmother." Her laws are stern, and the transgressor pays the penalty. But this is no excuse for painting her as more harsh, not to say cruel, than she really is.

CHAPTER II

STAGES IN HUMAN EVOLUTION

WHEN we look at a great mountain, we notice first its height and shape. We observe its cliffs and great rock masses, its summit in the clouds. As we approach nearer we see that its slopes are covered with pastures and forests abounding in life. We know something about the mountain. The geologist tells us that it is composed of material which was slowly accumulated at the bottom of some primeval sea. Age after age contributed to its bulk. Its strata bear witness to the life of the different periods of its formation. Gradually it was raised to the surface, and then lifted or crowded to more than its present height. It has been hardened by pressure, plowed and scored by glaciers, broken by frost, and polished by wind and rain. Very gradually it has gained its present form and height from a very humble origin. Now we begin to understand the mountain.

Similarly man is a very complex being with a history far longer than that of any mountain. His organs are of very different ages; some very old, others of quite recent origin. They have been formed under different conditions and to meet different emergencies. Could we know his history, we should understand him far better. We should appreciate, for instance, the struggle between the old and the new, the low and the higher, the brutal and the spiritual.

It is not necessary to write a complete history of either his physical or mental evolution. But certain peculiarities of structure in higher animals point so clearly to earlier and lower stages for their origin that we may feel fairly certain that man has passed that way, and we must glance at a few of them.

Our sketch naturally falls into two portions. First we must trace the stages of development of the individual man. The earlier part of this portion will show the rise of almost purely physical organs—stomach, heart, muscles, etc. As we follow the evolution of the body, we cannot fail to notice how the appearance of more powerful and complex and finer muscles, the swifter loco-

motion, and more varied and precise movements, reacted on the nervous system, and especially the brain, and stimulated the development and rule of mind.

But man is a social being. He is born a member of a family. He is a citizen of a community of some sort—clan or tribe, town or city. The rise and effects of these two institutions will form the second topic of our study.[1]

The earliest living beings of which we have any knowledge consisted of single cells. We have seen that a cell is composed of a little mass of semifluid living substance (protoplasm) surrounding a central, more consistent body, the nucleus. The protoplasm of these lowest animals contracts or sends out processes; seizes food, digests and assimilates it. The dead matter of the food is vivified in the cells, the constantly recurring miracle of life. It excretes, breathes, and seems to feel. It performs all the functions of all the organs of higher animals, though often in a very crude and rudimentary fashion. Truly, protoplasm is a " quite peculiar

[1] See more detailed study in Tyler, J. M., "The Whence and the Whither of Man."

juice," as Mephistopheles said of blood. But this stage, while exceedingly interesting, is of little practical importance in our study. We must hasten on to the second stage. Here the cells have multiplied greatly, and a certain amount of division of labor has resulted in differences in their structure.

We might call it the cœlenterate stage, for all the animals which clearly and unmistakably show its type of structure were formerly reckoned to this subkingdom. Its typical form is seen clearly in our little fresh-water hydra and its allies, less distinctly in the sea anemones, still more modified in the jellyfishes. The old naturalist called all these animals zoöphytes or plant animals. The chief characteristic of this stage is that the animal is composed of two layers of cells arranged in the form of a double-walled sac. It might be compared to a shopping bag lined with velvet and covered with silk, but with lining and covering glued fast together. Most animals of this type are stationary, but the primitive ancestor probably moved by means of a myriad of microscopic oars shaped like eyelashes and hence called cilia.

The opening into the sac is the mouth, the

cavity is the stomach or digestive system. A little mass of cells on the outside of the animal forms the reproductive organ. Rude muscular fibrils occur. The beginnings of a nervous system are seen in the shape of a cobweb of cells and fibers encompassing the body between the two layers.

The cœlenterate has only two organs which are even fairly well developed, those of digestion and of reproduction. The animal lives for these two functions. They are absolutely essential. The digestive system furnishes the material for growth, for the support and all needs of the body. Reproduction insures the survival of the species and the possibility of progress. Apparently very little has been attained. Let us not despise the day of small things. The absolutely essential organs have been shaped and tissues have arisen. There is the promise of better things.

The third stage is of vast extent, and includes all animals from worms to the highest apes. We might call it the animal stage to distinguish it from the almost vegetative zoöphytic stage which preceded it. We can easily divide it into several substages, whose members live on very

different planes of life and show very different degrees of activity.

The first substage is well represented by worms. These vary greatly in form and structure. The higher worm is a cylindrical animal, like the earthworm, moving with one end foremost. Some day there will be a head at the front end. It has developed layers of muscles, and is using them for locomotion as well as directly for gaining food. It consists essentially of two parallel tubes, one within the other. The outer tube is the muscular wall of the body, the inner the intestine running straight from the mouth to the hind end of the body. Between the intestine and the body wall is a space, the perivisceral cavity, in which circulatory and nervous and other systems are safely packed away. This plan of structure was attained only after many experiments and comparative failures. But it proved so advantageous that it descended to and characterized the trunk of all higher animals.

A muscular fiber is a microscopic engine which produces energy by the oxidization or combustion of food material, as coal must be burned in the fire box of the locomotive to make

steam. But the fire box needs an indraft to bring in air, and a flue to carry off products of combustion. Similarly the muscle requires an excretory organ like our kidney to remove some of the waste and a means of gaining oxygen. Gills soon appear. A muscle contracts only under the stimulus of a nervous impulse. Hence the nerve cells multiply and gather in groups, ganglia and cords. The moving animal can make good use of and requires sense organs for its guidance, to perceive its food, to avoid danger. These react on the foremost ganglia of the body. They form a brain. But a true brain or head was attained only by descendants of worms. A circulatory system will soon appear to hurry food and oxygen to all the cells of the body and to carry off their waste. To build all these organs, and to unite them in one compact and mobile body, was no easy problem. It was attained slowly and only after many comparative failures.

Worms lifted life to a plane far higher than that of cœlenterates. After their appearance only muscular and seeing forms could hope to play any leading part in the world. They developed weapons of offense and defense. Life

became harder, the struggle more severe, competition more marked and harsh. A strong, tough, agile, alert body was to be developed. Worms led the way toward this. But they had only begun to utilize and realize the possibilities of the muscular system. As soon as this and the visceral organs needed for its support and service had been fairly started, the worm began to experiment in building a skeleton. Three forms of skeleton are possible.

First comes the external skeleton used by mollusks and other animals as a means of protection. The shells of snails and clams are good illustrations. Second, there is the external locomotive skeleton, a framework for the attachment of muscles which move the jointed levers of the legs. This is well illustrated by the horny covering of insects. It is really, while somewhat protective, a passive organ of locomotion. In the lobster and many crabs it becomes so heavy as to hinder locomotion and to be largely protective. The third form is the internal skeleton used originally almost entirely for locomotion. This is illustrated by our backbone. Ribs and cranium are protective structures of later origin. Many vertebrates, turtles and armadillos, have

a protective skeleton also. Some mollusks reduced or cast off the shell. Each form of skeleton was an experiment by itself. Each was tried with a great variety of modifications. The experiments were extensive and exhaustive. Every line was made or marred by the skeleton which it developed.

The only completely successful experiment proved to be that of vertebrates. Every other form of skeleton had some fatal defect. The extreme logical result of molluscan development is shown by the clam. He developed a bivalve shell and burrowed in the mud. He thus gained almost complete protection from his enemies, abundant food, rapid increase in numbers, and nearly unchanging surroundings. Having once adapted himself to the mud, further development was entirely useless. But the shell hampered or prevented locomotion, made most of the senses unnecessary, stopped the development of muscle and nerve, and made further progress impossible. Amid all the changes of the vast geological periods the clam has slumbered peacefully in inexpressible comfort.

The external locomotive skeleton of the insect favors muscular and nervous development. In-

sects move swiftly and have good instincts, though lacking in intelligence. The skeleton is exactly suited to the needs of small animals. Very few of its possessors have attained anything like large size.

The internal skeleton was at first a rod of cartilage running along the back or near the dorsal surface of some primitive fish. This was later replaced by a backbone. The muscles formed two great masses on its right and left sides. They propel the body swiftly through the water by vigorous sweeps of the tail. More fuel and oxygen were needed, hence the digestive and respiratory system were improved through vigorous exercise. More waste was produced and the kidneys became more complex to meet the emergency. The blood flowed more swiftly to carry oxygen and food to all the organs and to remove their waste. A powerful sacklike heart with thick muscular walls arose. Complex eyes and ears result from the adaptation of the body to swifter locomotion. The brain enlarged rapidly and became far more complex and effective. There is little or no thinking, but much perception and action. Only the most vigorous, powerful, alert, and agile can win the prizes of

life. Muscular locomotion is the dominating element in the life of the animal. But this is pulling the lower visceral organs and spurring the brain to a far higher stage of development and efficiency.

The lower stages of life were primitively all aquatic, though a few worms now live in damp earth. Some ancient ganoid fish began breathing air directly into a lung, jointed legs replaced the fins, and the first amphibian emerged on land. A new mode of locomotion had to be acquired. The legs were weak, the backbone incompletely developed. The animal must have looked helpless and unpromising. Slowly through a vast succession of generations of amphibia and reptiles the legs strengthened sufficiently to support the body. The writhing form learned to walk and then to run. The legs strengthened and lengthened and it ran faster.

More rapid locomotion on the land and in the air made larger demands on the internal organs. Heart and lungs enlarged and improved. More oxygen was gained, more fuel was burned, and more heat produced by the increased exercise. The heat radiated less rapidly from the larger body into the less conducting air. The tem-

perature of the body rose. This increased the vigor of every function, but its effect is most marked in the sensitive unstable material of the brain. The warm-blooded animal, moving swiftly through changing surroundings, began to think. I suspect that the dawn of intelligence came far earlier, but in birds and mammals it is evident and unmistakable.

Our history of the contributions made by lower and earlier vertebrates to human structure has been far too brief. Its brevity must not blind us to the importance and value of their attainments. A tough, vigorous, flexible, complex, and adaptable body was being framed, a body which could endure rigorous hardships and severe wounds, and which with a few modifications and additions could respond to all the demands and execute the orders of a thinking brain.

Such changes and attainments could not be made in a day. They lasted through the earlier geological periods, when time was reckoned by millenia or ages rather than by years.

Protozoa were microscopic, worms were small, the ancestral amphibians and reptiles were probably smaller than the average of their descend-

ants. This seems to be the rule. But they were probably larger than their invertebrate predecessors, and were gaining in size. With the increase in size came the increase in length of life. How early this became marked we have no means of knowing. But mammals generally live for several or many years. The hairy or fur-clad mammal can endure quite marked changes of temperature. He was pelted and buffeted with impressions from the outer world. He met new, oft-recurring, and often trying experiences. The lesson was repeated day by day, week after week, and year after year. Nature taught and educated him by hard experience, and by experience he became keen and alert. Instinct might suffice for the short-lived insect, but the mammal was to be intelligent.

The process of education lasted long, and progress was probably slow and often discouraging. Professor Osborn tells us that a whole fauna of mammals in early tertiary times became extinct, apparently because their bodies outgrew their brains. Food was abundant and dangers were few for these great beasts. In this primitive Eden of ease and peace, prosperity bred idiocy. But such easy fortune was not the lot

of most mammals. They were taught by hardship and danger and spurred by necessity.

The earliest mammals were somewhat short-legged, and brought the heel to the ground when they walked, as we do now. The brain was still small compared with that of later forms. But the respiratory surface of the lining of the lungs was very large, supplying plenty of oxygen. The lung capacity is the best test of the power of an animal, as of the proficiency of a child. The muscles, though heavy, were powerful. The animal was still somewhat below medium size.

Most of them seem to have lived on the ground, but our ancestors took to the trees, tempted by food or encouraged to climb by stronger enemies. While they remained small they could probably run along the branches like squirrels. But as they increased in size, the hind legs were used to support and push the body, the forelegs to grasp and pull. This difference in use gradually brought about the difference in structure between hand and foot. The fingers became longer and freer than the toes, the thumb more independent and opposable. Thus the arboreal life of our ancestors gave us our hands and fingers, our means of grasping and of using

tools. The use of the legs for pushing and of the arms for pulling accustomed the ape to a more nearly upright position.[1]

Our muscular system is composed of parts or successive additions which are of very different age and origin. The muscles of our trunk are inherited from the tubular body wall of worms. Shoulder and thigh muscles were developed by fish to move the fins. Arms and legs grew stronger through a long series of generations of amphibia and reptiles. Hands and fingers were developed by arboreal mammals. They mature in the same order in the human child to-day. Our muscles grow younger as we pass from the trunk outward to the fingers or downward to the toes. The muscles of the neck are very old. Those of the jaws are younger, those of tongue and lips and the muscles of expression in our face are younger still.

Hence physiologists distinguish between central muscles of the trunk and peripheral muscles of the wrist, and especially of the fingers. The muscles of the arm are central when viewed in

[1] See Heineman, T. W., "Psychic and Economic Results of Man's Physical Uprightness."

their relation to the hand, but peripheral relatively to the trunk.[1]

We usually begin any action or series of movements with central muscles and complete it with peripheral, so in picking up a pin from the floor or going to the table for a pencil. Hence central muscles have been called fundamental and peripheral muscles accessory by some writers. In fundamental movements of central muscles a little nervous energy suffices to stimulate and direct a large amount of muscular movement. In the use of the accessory muscles of the fingers the opposite is true in both respects.

Our trunk muscles are capable of but few simple movements, and these neither free nor precise. Freedom, complexity, and precision of movement increases as we pass from trunk to hand, and culminates in the fingers.

The centers in the brain which control these muscles show the same succession in age, and differ correspondingly in structure. A few large and powerful cells will suffice for the control of the trunk muscles. Centers controlling the fingers must contain many cells with very complex

[1] See Bibliography.

connections. As time goes on new centers are continually arising in the brain. These are more complex, finer, capable of higher action and of nobler uses. Slowly and gradually in the range of actions peculiar to man nervous energy is playing a larger rôle, while muscular power, though important or essential, becomes of secondary value. The athlete is a man of nerve. Our weariness and lack of endurance is far more of the nervous than of the muscular system.

Late in tertiary times primitive man or his anthropoid ancestor forsook the trees and lived upon the ground. His legs lengthened to give a longer stride. His trunk and arms became relatively shorter. His whole body became more finely molded and better fitted for higher ends. The center and main scene of evolution was shifted from the muscle to the brain, from the body to the mind. It is hardly correct to speak of any arrest of the body as far as evolution is concerned. Muscles may not be increasing in bulk. But brain and mind are reacting upon bone and muscle and subduing and molding them to their own mental ends. They are making the body a fitter expression of the higher mental life. The body is becoming an expres-

sion of thought. Muscles of speech and expression are more effective and really more powerful than those of back and legs. The postpliocene or quaternary age is the era of mind.

The lower animal has a very limited range of environment. It moves but a little distance and becomes acquainted with but few objects or forces. The higher animals range over a wide territory and learn finer shades of difference between a host of objects. Man's home is the world or the universe, and he is interested in all its features. The animal learns the relation between a few important objects and himself. Man is interested in the relation of objects to one another, even when the relation to himself is dim and remote.

Finally animals, either consciously or by a blind instinct, make some provision for the future. Migrations take place or food is stored up against the approach of winter. These provisions are more numerous than we suspect. But they generally affect a future almost immediate or near at hand. Only as man searches far back into the past experience or history of his family or nation does he begin to peer into the remote future and to prepare for its opportunities and

emergencies. Thus in many respects the animal mind is a crude type or dim prophecy of the human.

Said Professor Huxley: "Man now stands as on a mountain top far above the level of his humble fellows, and transfigured from his grosser nature by reflecting here and there a ray from the infinite source of truth. And thoughtful man, once escaped from the blinding influences of traditional prejudice, will find in the lowly stock whence man has sprung the best evidence of the splendor of his capacities, and will discern in his long progress through the past a reasonable ground of faith in his attainment of a nobler future." [1]

The lofty plane of life on which man lives and moves is the result of his higher intellectual as well as of his moral and religious instincts, thoughts, purposes, and powers. His higher intellectual and his moral powers are evidently due to the fact that he is a social being living in some sort of family life. Our first question is: Are family and society artificial and conscious human inventions, as it were? This question will occupy us in the next chapter.

[1] Huxley, T. H., "Man's Place in Nature." Chap. II.

CHAPTER III

FAMILY AND SOCIETY

THE lofty plane of life on which man lives and moves is the result of his higher intellectual, as well as his moral and religious instincts, thoughts, purposes, and powers. His higher intellectual and moral powers are evidently due to the fact that he is a social being living in some sort of family life. Our first question is: Are family and society artificial and conscious human inventions, as it were? Or are they rooted deep in his very structure, to a certain extent necessary results of his constitution, products of an evolution which was urged or forced upon him by conditions outside of his choice or knowledge?

Two sets of forces or streams of tendency have united to produce these two great human institutions and to give them their present form. One of these is at first purely physiological, the other the result of an instinct or feeling. We

must trace their quite distinct origin, and then we can appreciate their great power when united.

The amount which any animal can devote to reproduction is the balance left after the needs of the body for repair and fuel have been met. Our muscular and nervous engines consume a large amount of the food which we can digest. The balance is very large in the stationary or sessile animal, smaller in the sluggish, greatly diminished in the active. It is greater in small animals than in large ones. Vertebrates are large and active, and mammals and birds are the most active of all vertebrates. The evolution of the muscular system, while increasing the supply of food, has greatly decreased the balance left for reproduction.

While the amount which can be devoted to reproduction has steadily decreased, the amount required to produce a new individual has increased just as steadily. Every egg must contain enough nutriment to build and develop an individual capable of taking and digesting food and of further growth. To build a sponge or a hydra requires very little. A worm is more expensive. A fish costs even more. The frog's

egg may have a diameter ten times as great as that of a certain fish; it should contain one thousand times as much material. The egg of a bird contains from one hundred to one thousand times as much food as a frog's egg.

If the amount of material which the animal can put into eggs is rapidly diminishing, and the amount required for every egg is increasing, the number of eggs must be lessening rapidly. We may say roughly that for every egg produced by a bird, the reptile produces ten, the frog fifty or more, and fishes from one hundred to ten thousand.

This diminution in the number of eggs, while unavoidable, is a very serious danger to the survival of the species. It greatly diminishes the chances of favorable variations. If it goes too far, the number of individuals in successive generations will steadily diminish until the species becomes extinct. The fish can survive even if a large share of its eggs are eaten by other animals; not so the bird or mammal. Every egg is of great value. Eggs and young must be guarded and cared for. Hence the nesting habits of birds and the intrauterine development of all mammals except the very lowest are a physio-

logical necessity. Hence many reptiles and some amphibia and fish have become viviparous, producing living young. The young mammal must be protected, fed, and tended by the mother. The higher the mammal the longer the period of dependence of the young. After a time the male begins to protect and coöperate with the female, and aids her in gaining food. In many species of mammals the male takes no such share in the care of the young, in others they coöperate during only a small part of the year. Birds of prey mate for life.

The anthropoid apes have a long period of pregnancy, and the young have their infancy and childhood. Here the protection and coöperation of the male is needed continuously. Without it the species would probably have become extinct long ago. Thus a rude form of family life is an absolute necessity imposed upon the animal by the higher development of its muscular and nervous systems. The development of the family from this standpoint has been well treated by Mr. Fiske and Mr. Drummond.[1]

[1] Fiske, J., "Destiny of Man"; Drummond, H., "Ascent of Man."

If food is very scarce and hard to obtain, the families will probably scatter and live singly. But in most cases the separation will not be complete and permanent. Clusters of families will form a small clan, and these clans will gather in tribes. In one way or another social life is almost sure to follow the rise of the family as its original constituent element.

Kropotkin [1] and others have shown that social life can originate without the family as its basis and unit of organization. The fact of a gregarious instinct in animals is undoubted. This instinct is far older than the comparatively modern family institution. Fish seek their spawning grounds in vast shoals. Seals and porpoises are found in groups. Birds flock and mammals herd. The flock or herd is an invaluable means of mutual aid and protection, as Kropotkin has shown. Many weaker mammals probably owe their survival to this instinct or habit. It is very well marked in monkeys, and generally throughout the order of primates.

Hence some writers think that human beings first gathered in hordes of men, women, and

[1] Kropotkin, P., "Mutual Aid a Factor in Evolution."

children, and that family life was of later origin. Westermarck [1] has brought very strong arguments against this view. It is very strange, when something closely approaching family life had been attained by anthropoid apes, and probably characterized our prehuman anthropoid ancestors, that this most valuable or essential human institution should have lapsed or been suppressed during man's early history. The horde, where still occurring, seems more likely to be degenerative than primitive.

In all higher stages of civilization we find family and social life both existing. In some times and nations more emphasis is laid on the family, in others more on society. Both institutions are essential to social health and well-being. In the most successful and progressive tribes, especially in our Aryan civilization, a sound family life has been the basis of society. Both must be perfected and adjusted in that higher civilization which is slowly evolving. We may safely consider both these institutions as permanent and exceedingly effective elements in human evolution.

[1] Westermarck, "History of Human Marriage."

The advantages of family life are so many that we have no time to mention more than a few, and so clear that a long study is unnecessary. The children are insured food, shelter, and protection; healthy growth, and physical well-being. The child has the advantage of all the experience of his parents, and of many generations of his ancestors, as this experience is handed down by tradition. The use of articulate speech and language broadened and clarified human thought and conception. Most important of all, in the close bond of the family mutual competition is replaced by mutual helpfulness. A large amount of energy which had been worse than wasted is now utilized for the common good.

Natural selection is not prevented by the family; probably its effectiveness is little, if any, decreased. But the mode and final result of the process are greatly changed. Always in the end only healthy individuals can survive. The better conformed to environment will have a great advantage. But there will be a selection of families as well as of individuals. The most firmly united and best regulated families will in the end outlast and "outpopulate" inferior

ones. Mutual service in the family begets mutual love and a host of fireside and homespun virtues. Control, forgetfulness, and sacrifice of self train and strengthen heart and will. The fundamental and essential moral and intellectual training and progress are, and must always be, the work of the family.

It is impossible for us to appreciate the debt which we owe to society, for we can no longer imagine what life would be without it. Of much of its influence and power we are as unconscious as of gravitation or of atmospheric pressure. We must try to imagine life without government, laws, or any form of fixed regulations. Who is to keep peace between squabbling families and individuals, not yet powerful or skillful enough to wage real warfare? Has any man any rights except what he can maintain for himself—*Faustrecht*? If there were any rights could anyone be compelled to respect them? How is it possible to hold people together long enough and closely enough so that law and government can arise?

Man's ancestors had been social or gregarious animals. There was a fellow-feeling, an instinct to keep together. During this long period of

gregarious or social life usages and customs had arisen. No reason for these was ever asked, but they were the raw material out of which laws and institutions were made, or the germs from which these blessings sprang.

In the Aryan tribe community of descent, real or fictitious, was the bond of membership. Evidently the family, whatever its origin or character, was a unit or conception of great power. The clan government must control the family, as the family controls its individual members. It may be very rude or tyrannical, it must be strong and firm. Despotism was far better than anarchy.

The savage has not one tenth of the freedom which we enjoy. He has very little which he can call his own. Property and ownership are modern ideas. His actions are trammeled in a great variety of ways, which seem to us unnecessary and ridiculous. The laws to which he must render obedience seem often unreasonable. Above all is the terrible pressure of usage and custom. Everything must be done as it always has been. And this tyranny and despotism were absolutely necessary to hold men together until society could gain form and cohesion. It was

an essential stage of preparation for the freedom which we enjoy.

A second characteristic of primitive society is the widespread, if not universal, idea of tribal responsibility for the offense of any and every member. When Achan sinned, all Israel suffered without a murmur. When Agamemnon had offended the priest of Apollo, the Greeks died under the arrows of the god. Tribal religion and morality consisted mainly in observing a host of customs and ceremonies. It was very easy to sin against the gods. The very existence of the tribe depended upon the strictness of its discipline. Held together and apart from others by community of descent, custom, thought, action, and religion, the tribe moved on in lock-step.

Individuals had to learn to live and get on with one another. The man who could not or would not conform was outlawed, and outlawry was worse than quick death. Each man under such conditions finds that he must do certain things for others, and that he can claim certain things from them. If his fellow is in difficulty or danger he must help and defend him. In times of scarcity he must share his little hoard

of food with others. In time of war he may prefer to remain at home. He goes. His own wishes and preferences make little difference. He learns what he can claim and what he owes. Thus he comes to recognize rights and duties, though he may never use the words or frame any conception of their meaning in the abstract.

Man as a social being is very ready to accept the estimate placed upon his actions by his fellows. It is not easy to resist public opinion now. It must have been almost impossible in that primitive army which summarily outlawed or killed the obstinately disobedient. This feeling tended to develop a conscience in the individual answering to the needs, estimates, customs, and regulations of the community.

The primitive religion was a tribal religion. The gods felt toward a man just as his neighbors did. God was always on the side of custom and tribal opinion. A public opinion of this sort is irresistible, and a man's conscience and estimate of himself and of his actions must conform to it. This does not explain the origin of man's conception of right; perhaps it presupposes such a conception in some dim form. But,

given such a dim conception, I believe that primitive human society gave it its iron grip on every fiber of man's nature.

This old tribal education, necessary and beneficent as it was, had its dangers, as Bagehot has shown.[1] It was the relentless foe of individuality, originality, and hence of progress. Even the slightest and most beneficent changes might call down the anger of the gods. Progress stopped in many Oriental nations. Everywhere it had to be exceedingly slow and gradual. Education into liberty cannot be accomplished in a day or generation, otherwise the inestimable benefits of tribal education will be lost and anarchy will return.

In Israel the progressive prophet faced the conservative priest. In Germany, Greece, and Rome the people seem to have always had a voice in the government. The crust of custom, to borrow Bagehot's phrase, had to yield to this pressure. Individual rights were finally emphasized as much as individual duties. This tendency is now so strong that we need to be reminded of the warning of the great German

[1] Bagehot, W., "Physics and Politics."

thinker who said: "You can never build a strong and permanent institution or movement on privileges, but only on duties. Not what men receive, but what they give, makes them strong and truly rich." Thus modern government and society slowly evolved.

Human social evolution has hardly more than begun. The great advantage of family life is that each member contributes what another lacks, and thus all are benefited by the partnership. Society must realize and utilize to the full all the possibilities of the individual and the family. They must enjoy as far as possible equal and full opportunity to completely develop their best powers and capacities, and thus to contribute as much as possible to the common welfare.

Every individual and family can enjoy full freedom of opportunity only in so far as this does not interfere with the equal rights of neighbors. The family has succeeded in replacing mutual competition by mutual helpfulness. Society is a means of accomplishing the same result between families and classes. Here the problem becomes more difficult. The family is more powerful and harder to control. It far

outlasts the life of the individual. The parent finds in his children a stronger motive to amass, concentrate, and hold wealth than in his own individual ambitions. Hence the socialist often attacks the family institution as the great source of injustice and inequality. Still the family is the basis and bulwark of society. Mutual understanding and sympathy between classes is evidently the first step toward mutual help and support. But progress and change will be slow.

The social body or community is at first very small—a neighborhood, village, or town. All outsiders are barbarians. It enlarges into clan, tribe, and nation. As it enlarges, it is in great danger of losing its unity and solidarity. Classes or castes, associations, aristocracies, plutocracies, or hierarchies arise and flourish. It is in danger of neglecting its unfortunates and derelicts until they spread disease and decay throughout its body.

Nations are slowly discovering that war, whether by tariff or guns, is expensive and burdensome. They would gladly do away with it. They are slowly discovering that the wealth of any nation enriches instead of impoverishing

the rest. The brotherhood of nations is no more difficult or impossible to-day than was the union of clans or tribes some thousand years ago.

Society does not neglect the physical welfare of its members, but it is largely a means of mental progress and evolution. Even intellectual development is less important than moral and religious. The latter have always accompanied one another in the evolution of any healthy society or civilization. They promote freedom by inculcating respect for law, and show that "perfect liberty is perfect obedience to perfect law." The only sure and lasting foundations are virtue and righteousness.

Whatever the future may have in store for us, these great social or popular movements and tendencies will never be arrested until something has been attained far higher and better than our present conditions, hopes, or dreams. Evolution will not cease, and it will work toward higher and grander ends. Its aim will be the expression and the realization of the highest ideals and deepest and most complete physical, mental, moral, and religious welfare of the people. We do not know the form or constitution

of the future government. We hear of the Family of nations and the Brotherhood of man. It will be all this, and something more. Perhaps the old prophet had the clearest vision of the future when he foretold a kingdom of God, a kingdom of universal righteousness, joy and peace.

We have seen clearly that the evolution of man has been by a series of advances from lower planes of life to higher. The zoöphyte lived to eat and reproduce. The worm crawls, the fish swims, the reptile has emerged on land, has gained freer movement and broader life. Mammals point toward social and family life.

Finally man advances through stage after stage of savagery and barbarism to civilization, law and order, arts, science, and religion.

We notice that the rise of a new system or power — skeleton, legs, or brain — seems only after a time to unfold its great advantages, and then only does the group attain its full supremacy. Evolution ends in revolution as the group fully attains the higher plane of life.

In the upward march toward man many forms drop out at each stage and go little or

no farther. Modern clams and snails, crabs and insects, amphibia and reptiles, are the descendants of such stragglers. Most of the army settles or straggles or turns backward or downward; comparatively few keep up the advance and finally push on to the next higher stage. Here again a similar sifting process occurs.

Evolution implies the possibility of progress, stagnation, or degeneration. Any species or group of individuals may rise, adapting itself to a higher plane or habit of life, or it may sink or degenerate. Stagnation or degeneration is easier and more common than progress, but usually results in extinction. The fact of degeneration demands our most careful attention.[1]

We notice at once and very clearly the great complexity of human organization. Man is a product of the ages, and every age has contributed to his structure and powers. Protozoa formed our cells. Cœlenterates gave us the beginnings of our digestive and reproductive systems, and the tissues out of which other organs were to be constructed. Worms, wise master builders, framed our trunk. Group after group,

[1] See Bibliography.

through successive stages, added to the muscular system, strengthening and shaping our legs, arms, and hands. Only man attained the full, free, and complete use of the fingers. The place and rôle of the muscular system in the evolution of the race and in the development of the individual has never been properly appreciated or emphasized. It is the strategic center of all evolution and education up to the last and highest stage.

But the evolution of this system changes its direction somewhat from stage to stage. The old trunk muscles are heavy, fitted only for crude, rough, hard work. The successive additions are continually lighter, finer, fitted for more complex, precise, and higher actions. More and more nervous energy is required for their use and control. Muscles of speech and of facial expression, so characteristic of man, find their main use in manifesting thought and feeling. Mind has very gradually been mastering and permeating the nervous system, and through it the whole body. The final goal of physical evolution is evidently not the biggest body with the heaviest muscles, but the one which shall be the best and most complete expression of the

highest and best human mind. First comes the physical, then the mental and spiritual slowly gain ascendancy and complete control.

Mentally, as well as physically, man has inherited from all ages and stages of life. Appetites are old and deep-seated, rude and very strong. His senses are keen. Old motives, like fear or hate, are always threatening revolt against the higher and younger moral and religious ruling powers. But slowly, as man attained the human stage, love of beauty and truth, of right, of fellow-man and of God; obedience to the laws of reason—in one word, the real human life—rose superior to the appetites and passions of his old animal ancestors. It has been a long and fearful struggle. *Rex regis rebellis.* The king has always been in rebellion against the king. The lower always appeals from and against the higher. Ape and tiger die hard.

Where so many powers had to be evolved, they could not all advance equally at one time. The first organs were those insuring growth and survival. These were fundamental. Only when they had been firmly established could anything higher be introduced. But upon this founda-

tion of strength a superstructure of beauty, grace, and fineness could be reared.

Hence the line of evolution is anything but straight and direct.[1] It must often seem illogical. First it is directed toward one attainment, then toward another. Through the struggle for existence natural selection favors at one time the development of one power, then of an entirely different one.

No wonder, then, that our ideas of evolution become confused. We are not surprised to find that many writers and keen thinkers have proposed theories of human progress really applicable and adequate only to worms, clams, or reptiles. The story of evolution becomes "full of sound and fury, signifying nothing."

Thus far our study of animal development has given us at best only a chronicle of events. Can we make this chronicle a history by finding that certain great laws unite all the events and changes in one grand progressive evolution? This is the great question and problem which we must seek to solve in succeeding chapters.

[1] Huxley, T. H., "Evolution of Ethics," last part.

CHAPTER IV

THE LOGIC OF EVOLUTION [1]

OUR sketch of the stages of human evolution has given us glimpses of a great drama like one of Wagner's trilogies. Scenes shift and different heroes follow one another on the stage. But the story seems disconnected. The gaps and breaks are very wide.

This is necessarily the case when we attempt to give in a few pages the history of the animal kingdom in all ages. Even if we had unlimited time and patience for our study, the history would remain incomplete. Our knowledge is very limited. But small and incomplete as it is, it may be valid so far as it goes. I see a great mountain. I have looked at only one side of it, perhaps. I may have correct views concerning that side, even though my knowledge of the whole mountain is very inadequate.

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[1] See Appendix Charts V. and VI.

I travel toward the mountain, and am carried to the top by a railroad. Clouds have settled and have obscured my view. Yet when I look down from the summit in the clearer light of the next morning, I do not need to trace the whole line of the road in all its turnings to know that I have passed from a smiling valley to forests and pastures, thence to bare treeless rock, and finally over ice and snow. I must have passed these landscapes successively, for they lie in zones encircling the mountain.

With almost equal certainty I can say that man in his evolution passed successively through unicellular, vegetative or cœlenterate, wormlike, and vertebrate stages. These stages stand out separate and disconnected in our hasty sketch. Let us see if their succession is not entirely logical and exactly what we might expect.

We begin with the marvelous living substance —protoplasm. It digests, breathes, excretes, feels, adapts itself to the most varied conditions. Its most noticeable characteristic is its power of adaptation, its fitsomeness, as Professor Brooks has emphasized. Whence and how did it arise? I, at least, have no theory to offer. Gradually it fashioned the cell, a still more marvelous

structure capable of forming all the organs and doing the various kinds of work required in our body. Cells began to unite in groups, and some of these groups took the form of a double-walled sack, our zoöphytic ancestor. This little animal had two organs, one for digestion and the other for reproduction. These are the two essential functions, which insure the growth and survival of the individual and the species. Power of locomotion was small. But a little muscle was necessary to gain food and to keep the body in shape. As this was used and exercised it increased in amount.

Then some zoöphyte changed its mode of locomotion. Instead of depending upon its microscopic oars (cilia) it used its muscles. It was a slight change, but it revolutionized animal structure. To move even a little less slowly and to seek its food over a wider area was a great advantage. From this time on the animal which developed muscle survived, and gradually replaced the form which developed digestion only. Muscle stimulated the development of respiratory, circulatory, and excretory organs. These were grouped to form the trunk of the body of higher animals. The exercise stimulated the de-

velopment of the skeleton, and of something higher, more complex, and of far greater possibilities—the nervous system. Swifter locomotion, search for food, new surroundings with their possibilities and dangers, made better sense organs very profitable.

Muscles and sense organs reacted on the nervous system and lifted it to a higher plane. The visual eye, capable of seeing images of objects, the most complex and youngest of all the sense organs, appeared. From this time on only those animals which could see could hope to win in the struggle for life and supremacy.

The front part of the nervous system enlarged under these stimuli and shaped itself into a brain.

The smaller, lower animals are usually short-lived. The larger vertebrate lived for years or decades. The same experiences came to it again and again, and new emergencies and dangers often confronted it. Life was a series of experiments for all our ancestors. Mr. Erasmus Darwin defined a fool as a man who never tried an experiment. The experimenting animal became in time intelligent. Higher mammals, like dog, fox, elephant, and monkey, are often shrewd. Wits counted in the struggle as well as muscular

strength and agility. Slowly, but surely, mind crowded muscle off the throne of the animal body. The brain reigned supreme. Quaternary time is the era of mind.

There have been three dynasties in the history of evolution—first that of digestion and reproduction, then that of muscle, and finally that of mind. Each lower dynasty needed, stimulated, and thus ushered in, the reign of the next higher power, and then became subservient to this. Every higher power begins its career as the servant of the lower. The reign and dominance of the higher power does not destroy or hamper the development of the lower function. The digestive system attains its highest development not during its period of supremacy, but in its service of muscle and brain. The same is true of the muscles. They are not as powerful in man as in some lower animals. But they are numerous, varied, complex, and capable of finer and more complex movements. There is no "arrest of the body." It becomes continually finer, better adapted to higher uses and nobler ends discovered by the thinking brain.

As each higher power was needed for the complete use and development of the lower, the

sequence of dynasties was logical and natural. The higher had to arise except where there was arrest of development. The reign of mind was the only logical goal of even zoöphytic structure and development, and the worm foreshadowed the coming of man. The lower structure and stage is evidently incomplete. It must be estimated and judged in the light of the higher to which it is a stepping-stone. Any other view leads to serious error.

But the lower organ or function once firmly established and supreme in the body does not readily yield its control and abdicate in favor of the higher power of greater possibilities. There is, and must always be, a struggle for supremacy between the lower and older and the younger and better. The revolution succeeds only against strong opposition. Old habits must be broken and new ones formed. This is exceedingly difficult for animals and men. Hence many fail to enthrone the higher power, never break from the old habit or mode of life, and remain permanently on the lower plane.

Every function or power holds the throne as long as it is capable of rapid improvement, more rapid and profitable than that of any other sys-

tem. A digestive system always remains comparatively simple. A sack or tube with a few glands is all that is needed. The reign of digestion may have been short. Muscle and skeleton are far more complex, capable of greater variety in amount, form, structure, and grouping. Their capacities for improvement are many and great. The reign of muscle lasted for ages. The era of mind is only begun. We know not what we shall be. But the possibilities of mental evolution are practically unlimited; they may be infinite. The era of mind and the reign of its higher powers, the supremacy of the highest motives, is sure. Its dynasty is secure. No other system in the body can dispute its place and right.

Animals and men have tried the experiment of reversing this logical sequence of ruling functions. Parasites and sessile animals have made the muscles serve digestion. Men frequently make mind the servant to the gratification of lower powers. The experiment has always resulted in degeneration and usually in extinction.

The rule or dominance of functions is successive, but they are all present in the first protozoan. They are of equal age. The digestive

system comes to the throne first just because it is simple, fundamental, and absolutely essential to life. Muscle follows in the march, more slowly at first, because more complex and difficult of development, and having fewer opportunities to show its usefulness and capability. Later it overshadows the digestive system. Similarly brain and mind were developing in the lowest stages. But it was a most difficult problem to form a brain. It could not show its power and capacity until the muscles and all the other organs were sufficiently mature to execute its decrees.

In tracing the mental evolution of animals we enter on difficult and dangerous ground. We know and understand the mental actions of animals only by comparing them with our own. Here we may easily mistake. We must use language really applicable only to the mind of man and higher animals concerning beings far down in the scale of life. Hence we can use the words knowledge, recognition, perception, motive, and choice only in an exceedingly broad or even figurative sense. We use these words only because there are no other familiar and plain terms which we can substitute for them.

The lowest animals distinguished and were attracted by but a few objects in a very limited range of surroundings. The world of a protozoan is a drop of water, and he distinguishes only a few minute particles of food. Worms come into a vastly wider range of conditions. They have good sense organs. They smell, taste, and see. Vibrations in the water make them aware of changes in surrounding conditions, not only of food to be seized but of dangers to be avoided. The worm has a far wider as well as more accurate knowledge.

But the study of objects becomes a stepping-stone to the study of their relations to us and of one to another.

Higher animals act as if they recognized relations. The bee associates bright spots, "honey guides," on the flower with concealed nectar, and thrusts his proboscis into the opening. Many animals recognize signs of danger. The hen clucks at sight of the hawk, and every fowl seeks shelter. The animal recognizes but a few of the simplest and closest relations between objects and itself. What is neither food nor enemy may usually be neglected. Yet some animals are very curious.

Man traces the relation between objects and himself and between objects but distantly and indirectly related to him. Science is really the study of the relations of objects and of the laws of their interaction.

New relations frequently arise, and some of them are of vast importance. The young are neither food, enemy, nor exactly friend, to the mother. But the relationship is very close and changes both their lives. In family and social life new relations continually appear which demand clear recognition, and in every one of which proper behavior must be fixed by custom or formulated by law and carefully observed. Man discovers what he must do for his fellow, and how much he may require of him. Intangible and invisible rights and duties have become the most important and stubborn facts in human life. He must recognize them and obey their laws.

Man, a comparatively weak and defenseless mammal, " a reed but a thinking reed," has forsaken his shelter in the trees and lives on the ground. He is surrounded by vast objects, buffeted by powers which he can neither resist nor

understand. The world is mysterious and fearful, if not awful to him. He is inexperienced in his new conditions. Life is an experiment, and the world a field of discovery. Gradually he becomes aware, or thinks he has become aware, of something or somebody not human, who will hurt him if he does certain things, and may help him if he does others. On account of hard experiences, or for other reasons, he begins to associate this being, power, or influence, with certain objects. Possibly he thinks that certain charms may protect him from the harm wrought by this dangerous neighbor. He becomes a fetich worshiper. Still he wonders about this strange invisible power which has intruded into his environment. He experiments here as elsewhere. He thinks he discovers somewhat more. The being seems to have knowledge and will like himself, or it acts more like certain powers of nature. He begins to form hazy and dim conceptions concerning it. Religion plays a very large part in his life, and begins to modify all his actions. It gives its sanction to his crude code of morality, promises rewards and vague but terrible punishments. However we may explain its origin, it is a fact that man is a relig-

ious being.[1] If our study of man is not to be fatally defective, we must take this fact into account and give it due emphasis. It has had vast power for good and sometimes for evil in the lives of men and nations. And it, too, is only what we might expect as the logical and natural result of man's life and training.

The study of the development of religion is a science by itself. We cannot follow it here. From the fetichism of the savage to the worship of the one All-Father is a vast journey. But slowly, and often painfully and at fearful cost, the passage has been made by every great man and nation.

Growth in knowledge has modified the life and structure of animals and men indirectly, as it has furnished new and stronger motives for new actions and experiments. Survival and prog-

[1] Plutarch seems to have been nearer the truth than some modern observers and students when he wrote: "Pass over the earth, you may discover cities without walls, without literature, without monarchs, without palaces and wealth; where the theater and school are unknown; but no man ever saw a city without temples and gods, where prayers and oaths and oracles and sacrifices were not used for obtaining pardon or averting evil."

ress demand more than mere knowledge of surroundings or environment. Conformity to environment is the essential thing. The knowledge must result in action, the intellect must stir the will before any real progress can result. Hence the study of perceptions, of discovery, is practically of less importance than that of the motives which have stimulated and determined the line of action; for the line of action and habits influences that of selection and survival, and hence of evolution. Perhaps we ought not to speak of motives among the lowest animals. But we may venture to use this expression in spite of the fact that it implies will and choice. There is no better familiar word to take its place.

The only motive which the lowest animal can feel and which can spur him to action is hunger, and perhaps we ought to add pain. Worms avoid danger. They act as if they had a dim feeling of fear. Fear may be a low and primitive motive, but it is of great importance. Even the man who cannot fear is either dull or exceedingly reckless. He certainly is not wise. Anger and jealousy soon follow.

The social instinct beginning with a mere gregarious feeling goes on into love of mates. The

older and stronger members of the band or flock watch and protect the younger. But the great change from selfish or self-centering motives to those altruistic feelings which center about another's welfare comes with the evolution of family and social life. Mammals and birds protect their young at the risk or expense of their lives. In social life a similar feeling is extended to our neighbors so that a man may lay down his life for his friends.

Social life brings with it a series of new motives. A man must be true to his friends, to his clan, city, or nation. Friendship, patriotism, loyalty, honor, duty, become sources of motives of extraordinary power. They raise man above thoughts of appetite or of prudential consideration. When these rule the life, and in proportion as these rule, he becomes a hero of Titanic power.

Last in the series and youngest of all are the religious motives. Their grandeur is but dimly perceived and dully felt by the best. Sometimes a great prophet shows us their power. They are still struggling in our minds for the clear recognition and absolute loyalty and complete obedience which they will some day gain. We

cannot even imagine the power which they will bestow or the height to which they will raise us.

We cannot fail to notice that we have here a succession of motives of increasing power. Fear usually overcomes appetite; but anger, and much more, parental affection, overcomes fear. But even this emotion is of less efficiency than human maternal love where the feeling of loyalty and duty mingles with maternal affection. The lower motives may blaze out fiercely, but always more or less fitfully, the higher move toward a steady purpose befitting human powers and life.

The lower motives are easily satisfied, and often perish with the using. We remember our childish anticipations of the holiday dinner, and our disappointment because appetite failed before the arrival of the delicacies which we had most anticipated. And over-indulgence was followed by penitential fasting.

But the higher motives grow with every satisfaction of their cravings. The artist forgets cold and hunger in the joy of his creative work. Higher forms of beauty continually lure him to greater efforts. Professor Huxley used to say that the passion for original investigation was harder to break than the craving for intoxicating

drink. The more a man knows, the more he longs for knowledge. The best long most intensely for the highest. While the lower motives enslave, the higher give the most complete freedom to the man absorbed in their pursuit.

The line of evolution is not straight. We might compare it to an ever-widening ascending spiral, in which progress, while ever upward, is often apparently in almost opposite directions, as the earth swings toward and away from the sun in its elliptical orbit. The final goal is clear, but the direction of movement varies from stage to stage. We may speak of evolution as one process in reference to its end; we may speak of it with equal justice as a series of processes.

Life is first half vegetable, then more and more purely animal, finally human. Natural selection works first for good digestion, then for tough and powerful muscles, then for shrewdness, finally for righteousness and love. The spur to action varies from stage to stage, and new motives arise. Life is at first largely chemical or physical. Consciousness and thought seem hardly more than by-products. Life remains dependent upon chemical and physical forces and processes, but all these are directed by a

motive or purpose which has its seat entirely in the mind. In one word, if we are studying evolution, our views and even our definitions of its process or processes will vary according to the animal or stage of life whose evolution we are watching. A theory which would have been entirely adequate and satisfactory, when worms were at the head of the animal kingdom and its highest product, may be defective and misleading when applied to the evolution of men into something higher.

Even if our study of evolution should open our eyes only to the marvelous possibilities of life and teach us to wonder at them, it will not have been in vain. For "Wonder is the mother of wisdom." We see dimly great promises afar off. Present human attainments appear small and poor compared with the glory which is to be. We are called to higher attainments and uses.

We study history in order that, through our knowledge of its laws, we may forecast the future. We rightly believe that tendencies which have existed and strengthened through past centuries will continue in force. For this reason we believe that, whatever the form of future government may be, it must tend to ex-

press more fully and adequately the will of the people.

Our study of biological history has shown us certain laws and tendencies which have been working through thousands or millions of years, and which must therefore continue to guide or urge man toward some far-off goal. We must believe that progress will still continue accompanied by much stagnation and degeneration. Many will fall out of the upward line of march, as their animal and anthropoid predecessors have done in the past. Evolution is no guarantee of universal progress. But some will press on to a higher plane of life.

In this higher life the best attainments of all past generations will be preserved or improved. The lower vegetative visceral organs will not deteriorate. They are essential to life, and will be maintained or improved in the interest of bodily and spiritual health. The muscular system will still be needed to maintain health and to realize the plans and commands of the thinking mind. Finer actions of finer muscles of expression will play a larger and larger part in the life of the future. Knowledge will increase. Man will think not only of how to get a living, but

also and far more how to live. Getting will become a means of being, not the end in itself which it often is to-day. Knowledge of something more important and higher than mere material things will be cultivated. The higher knowledge better used will keep before the mind stronger motives which will stimulate the exercise of the highest powers, and thus lead to the largest life.

We see that as animals and men pass from one stage to another, new and higher powers successively dominate life. These powers usually have arisen from small and weak beginnings in the service of lower powers. The first business of animals or men at each stage is to make the highest power supreme and regal in the organism; to allow it no longer to be subservient to anything else, but to make everything else subserve it. This has been the history of the successive dynasties, which have characterized successive stages of progress and raised life to the human plane.

The human plane of life and development must be characterized by the rise to supreme control of powers and ideals which were far from being ruling powers in the life of animals

or lower men. These ideals must furnish the strongest and most enduring motives to the highest actions. The powers and their exercise must bring him into the closest touch with, and most complete conformity to, the highest and best environment. These dominating powers, ideals, actions, in one word, life must be completely on the human plane and worthy of it. The attainment of such powers and ideals, not yet attained or fully understood or appreciated, is the end, aim, and business of the present human stage of evolution. The powers which have raised man from the animal to the human plane, and which most sharply distinguish him from animals, are evidently the moral and religious. These alone are fitted to man's social and intellectual plane of life. These, therefore, not wealth or material prosperity, or even art and science, furnish the real ends of human progress. These alone can furnish motives for supreme and enduring effort. Only these stimulate and exercise the highest powers. Everything else is but a means to these ends, must be so regarded, and held strictly and sternly in its proper place.

Our fathers said that " Man's chief end is to

glorify God and to enjoy Him forever." Criticise the definition as you will, it recognized and furnished a chief end. The greatest and most widespread danger is that we shall pursue no chief end in life, but only a multitude of means. Life without any chief end worthy of the name necessarily remains low and weak. It really unfolds none of its powers. All its energies dissipate like steam from an open vessel. This is death.

We can make the higher powers subserve the lower, follow honesty because it is the best policy, be or seem religious because it is respectable, serve God with our eyes fixed on the main chance, and grow cross-eyed thereby. This is repeating the experiment of the parasite or sessile form on a higher plane where the ruin is more sure and complete. It can have but one end—degeneration.

"A house divided against itself cannot stand." It will not long remain divided. If pulled by two tendencies, it will follow the one or the other. It will become all slave or all free. What Mr. Lincoln saw to be true of the Union is equally true of the life of every individual. He will inevitably follow the higher motive or

ideal and make the necessary effort to rise to the next higher plane of life, or he will sink to the lower. There is no middle ground where he can stand still. There can be no unity in the life which is half anthropoid and half human. Halting between two opinions and aims leads no whither except to crippledom. There can be freedom in the use of our powers, and an end to strife and schism in life, only as we resolutely and continuously make the highest supreme. Only by this effort and through this warfare can we win peace. For in this realm and on this plane peace is won only by conquest, and is the reward of him that overcometh.

We are now prepared to describe man in the light of evolution somewhat more clearly. Man is physically a machine for the manifestation of energy. The digestive system furnishes the fuel. The muscular and nervous cells are the furnaces where the fuel is burned; respiratory and excretory systems correspond to draft and smoke-stack. The circulatory system is the means of conveying fuel and oxygen to the cells and of removing their waste. Every visceral organ is indirectly a means of power and efficiency.

The power is manifested through the mus-

cles. These build roads, write poems, and utter "winged words." But these muscles are of very different age, strength, and complexity of arrangement. The manifestation of energy is stimulated, controlled, and directed by the nervous system. Every display of power takes place in response to an external stimulus which affects some sensory organ or structure. It is made to avoid some danger, to seize some opportunity, or to meet some emergency. Hence the need of clear and accurate perception. New emergencies and opportunities are always arising and calling for new responses. Life is a series of experiments demanding the highest intelligence and wisdom.

Man is a social being. Family and social life, rooted in human structure, have imposed upon him new relations which he must recognize and to which he must conform. The family has trained him to intelligence and unselfishness and many homely virtues. Social life is, or should be, the school of morals. Man is a religious being and must recognize his relations and duties to God as well as to his fellow-men.

Man chooses means and ends consciously and intelligently. The goal of his effort once chosen,

the effort is maintained by the will. The strength of his purpose and the vigor of his efforts is proportional to the depth and intensity of his feeling or to the power of his motives. These motives are of very different age and character. Appetites, prudential considerations, love of beauty, truth, and goodness, moral and religious motives, form an ascending scale of value and power. The highest and strongest motives characterize the fully developed man and make him what he is.

Man is therefore a being of extraordinary complexity and of innumerable possibilities. He can rise to heights of wisdom and power of which we as yet have little conception, or he can sink lower than any brute. He can press upward in the line of progress, can stray or straggle from the line of march, or can stagnate or turn back. He has more possibilities of failure than the lower animal, and the attractions and allurements to stray from the upward course are more numerous and more powerful.

Only close attention to the highest aims and enthusiasm for the highest ends can unify so complex a federation of powers and direct the life toward a truly human goal. Otherwise en-

ergy is dissipated and wasted, and failure is sure to follow. Only the highest ends and motives can call forth the Titanic energy of man's highest powers. In so far as he fails of the very highest, he fails to be a man. To these highest spiritual powers and ends all lower powers and ends must be strictly and sternly subordinated.

But conversely the physical and the lower mental must be developed to the utmost as the necessary servant and supporter of the higher. Otherwise, however good and high his goal and ends, he is powerless to attain them himself or to lead and lift others to them. The machine is no stronger than its weakest point—physical, mental, or moral.

Man's greatest danger is that of incomplete development.[1] The goal of evolution is a complete manhood, where the tough body, clear and cool mind, warm heart with its intense feelings, and iron will set on the highest ends are all combined in one royal life. This alone is that wholeness, haleness, health, holiness, salvation —call it what you will—which characterizes the

[1] Clouston, T. S., "Neuroses of Development," London, 1891.

true man of real and full power.[1] Evolution points to a regenerated society composed of such men and women.

One of the greatest discoveries of modern science is the law that the development of the individual briefly and very incompletely recapitulates the evolution of the race or species.[2] The law of a logical sequence of stages in human, physical, and mental evolution, of a succession of thought and motives, applies to the development of the child as well as to the evolution of the race.

The baby lives in a sort of cœlenterate stage of almost vegetative life. His whole business seems to be to eat, digest, breathe, and sleep, to survive and grow. His education consists very largely in making his physical surroundings as favorable to bodily health as they possibly can be. But the baby gives dim promises of something higher and better. He grasps and handles and is interested in objects and persons. He is

[1] Compare Huxley, T. H., "Lay Sermons," New York, 1871, Article III; "A Liberal Education."

[2] See Bibliography.

perceiving. He kicks and wriggles; he will soon walk and run. The young child wishes to be continually in motion. He cannot sit still long. The muscular system is the seat and center of his development, as it was of his animal ancestors through long ages. This muscular exercise is lifting all his vital organs, heart, lungs, digestive system, and is giving him the first element of power—a tough body. It is tuning up the nervous system and stimulating the brain. His capacity for logical thought is very small, his moral and religious conceptions are dim and crude. He is still in the muscular stage, but curiosity and wonder and some thought show the dawn of the era of mind which quickly follows.

The really human powers rise at adolescence, as President Hall has showed us.[1] During this period of youth and early manhood, boy and girl struggle out of childhood with its conceptions and motives into true social, moral, and religious life. The higher aims, motives, purposes, character, and life must be established now or never. We must seize the opportunity

[1] Hall, G. S., "Adolescence," New York, 1904. See Bibliography.

or it will escape us once for all. It is a critical period. The boy may press upward out of the animal or half-human life into a complete manhood. He may partially stagnate in the lower stage, as clam and reptile have done before him. He may promise well, but the pressure of early adult life may hamper and stunt the development of all the higher powers. He fails to complete his development. The moral and religious powers are not crushed out, but they fail to become supreme. He becomes what he and others call a practical man, a prosperous Philistine, an anthropoid, but not a man. He may sink in criminality or bestiality.

The infantile and childish stages are absolutely essential to the development of a complete manhood. During them are laid the firm and rude foundations of physical health and vigor with the accompanying power, courage, hope, and faith of the athlete. These we must foster in every way, and at the same time stimulate but not overtax the nascent mental powers.

Similarly the education of the youth must not suppress the youthful characteristics. They are normal, healthy, and essential. The boy and girl must have their own conceptions and ideals, not

those of their grandparents. If we attempt to root up childish or youthful thoughts, purposes, and ideals, and implant our own in their place, we have broken the logical sequence of human development, and only harm can result. At the same time we must stimulate in every way the development of the nascent moral and religious powers, lest they fail to reach their supreme position in adult life. Any system of education which does not send the youth out into life with a powerful impetus toward all that is best and grandest has failed of its chief end and use.

The chief business of the adult is evidently the supremacy of these highest powers. Everything else is of secondary importance. Arrest of development at this point is fatal to the individual and to the race. The arrested individual contributes nothing essential to progress, and a society in which such individuals lead and control stagnates and probably degenerates. To be content with ancestral attainments is fatal. What was progress for them is often retrogression for us.

Only the complete development and supremacy of these highest powers can unify the life of the individual and make him a whole and

healthy man. Otherwise he dissipates his powers and fritters away effort in things of no real significance. He becomes insignificant himself. Arrest of development and loss of power through lack of one chief and worthy purpose and end is a fatal danger of the individual and of society.

Whatever be our theories concerning vital force or energy, it reminds us of a great master attempting to bring grand music out of a very inadequate instrument.[1] It seems to be struggling continually to clothe itself in a more suitable body, to express itself in all its strength and beauty in worthier forms. It rises from mire and water into air and sunshine, unfolds one physical power after another. It unmasks itself and behind the physical we see the transcendent glory of the moral and spiritual. These are the powers which are now shaping the body and molding thought and speech to their own highest ends. Yet we must take nothing for granted. Are these promises and visions merely the dreams of youth? Is what we see afar off solid moun-

[1] Compare Cope, E. D., "Primary Factors of Evolution," Chapters IX and X.

tain or mere cloud and mist? We must prove every step thoroughly if we would not fall into error.

Like begets like always, and still there is always variation. So far as we can see, the struggle for life is unending. Natural selection still works steadily and relentlessly. Still the fittest survive. The method of working varies, and the results of each process are always higher and larger. This much seems fairly certain. But we must study these forces or tendencies carefully in the light of all the facts of human structure and character before we can have an adequate theory of human evolution. Otherwise we may frame a hypothesis whose working would have doomed man to stagnation in brutehood, if not to degeneration and extinction.

CHAPTER V

THE SURVIVAL OF THE FITTEST [1]

INDIVIDUALS and species are continually varying. The unfit are weeded out; the fittest survive. Who are the fittest? Are there any permanent and essential characteristics of fitness true alike at all stages of development? This is evidently a most important question. Our answer to it will determine largely our views concerning the whole theory of evolution.

One or two characteristics of fitness are necessary and fundamental, and evident at the outset. The fittest form must be progressive. However great its past attainments, if it goes no farther, it will surely be surpassed and left behind by some other steadily advancing form. But progress must be continued through a long series of generations. Hence it must be capable of sur-

[1] See Appendix Chart VII.

vival. Otherwise it can contribute nothing to the progress of life. But a host of forms at first sight seem to answer these two requirements. We must find some means of sifting them still farther.

The safest line of study would seem to be furnished by geology and paleontology. We will attempt to catch a glimpse of our globe at various stages of its geological evolution, and to see what forms are competing for the prize of survival and leadership in the struggle for life. As we pass from stage to stage we can see the success or failure of the experiments tried by the most promising competitors in preceding stages.

There was life on the globe long before the beginning of paleozoic time. The "everlasting hills" have grown old, worn down, disintegrated, and almost disappeared since the lower forms of life arose. But the earliest forms of life were mostly soft-bodied, and it was impossible to preserve even traces of them. The rocks in which they were imbedded have been worn, buried, twisted, and often recrystallized. The few remains which have come down to us can tell us but very little. We catch our first clear

glimpse at the beginning of paleozoic time, or perhaps a little before its beginning. Here our chronology cannot be definite.

At this time a very large part of the surface of the globe was covered by a vast primeval ocean. The continents were hardly outlined. North America seems to have consisted mainly of a V-shaped mass of land with its point or apex near Lake Superior, and its arms stretching, one toward Labrador and the other toward Alaska, to the east and west of Hudson's Bay. The rest of the continent was mostly submerged beneath a great sea whose surface was broken by island or island chains. We do not know how much life there may have been upon the land. It was probably scanty. Our ancestors were still in the primeval ocean, the cradle of all life.

Mollusks were well represented. Clams were already safely ensconced and slumbering in the mud. Other forms with spiral shells crawled over the bottom. Cuttlefish, somewhat like our present squids, but with their bodies protected by a light shell, swam freely everywhere. They seem to have lacked the beak of our modern forms. But they could swallow most of their

competitors whole, so that this lack was no serious defect.

Crustacea, now represented by crabs and lobsters, crept or swam, had jointed legs, and were protected by a coat of plate-armor.

Swimming in the water above were some animals, probably about as large as good-sized earthworms. They had no defensive armor, and no weapon of offense. They had been driven from the rich feeding grounds of the bottom by the crabs and mollusks, and were living on the minute forms of life which they could sift from the water. These were the first vertebrates. There must have been other interesting forms; there were probably many peculiar and fascinating worms. But these we can pass by. They have mostly become extinct.

Which of these three competitors is the fittest? The free-swimming primitive vertebrate seems to be already distanced in the race. The crab is a well-protected, moving being, whose jointed legs promise a higher organization. But the cuttlefishes have everything their own way. They are completely protected, and that seems to count for most under present conditions. They move fairly well. They have abundance

of food, and can reproduce rapidly. They have possession of all the natural advantages, nine points of the law; and they have the size and strength to maintain possession, which should constitute the tenth.

We are hard-headed, practical men of science, who know nothing of the future. We judge by what we see, and by what the past can teach us. The mollusk must be the fittest. There is some hope for the crustacean, but none for the already distanced and defeated primitive vertebrate.

We come down into mesozoic time. The continents have taken form and shape. The eastern half of the United States has gradually emerged from the ocean. When the surface of the land was but very little above tide level, great forests of ferns and club mosses flourished, sank below the water level, were covered with sand and mud, and changed into our coal beds. On these great marshes amphibia have appeared. They had developed from ganoid fishes. In mesozoic time the land has risen higher. There are still great jungles or marshes covered with a tropical vegetation. Dryer uplands are beginning to appear.

The mollusks are surviving abundantly, but have made very little progress. Crustacea, or some ancestor of the crustacea, have given birth to insects. But these small, short-lived forms, governed by instinct, are no match for their larger competitors, which have started along the road which leads to warm blood, long life, and intelligence. These latter are all descendants of the poor primitive vertebrate which seemed already distanced in the race at the beginning of paleozoic time.

In the jungles, where food is most abundant, we see reptiles of every form and kind. Some stalk on two legs; others walk or run on four, much like our present herbivorous cattle. Others wade or swim in the great lakes. Some fly with batlike wings. In the sea great lizards flourish. Many of these are large and powerful, some of them swift and agile. They have heavy jaws and strong teeth. Many or most are mail-clad. No other form can join battle with them. Birds are flying through the air, though still perhaps half reptilian in form and appearance. We find a few small mammals, no one of them a match for even the weaker reptiles.

Once more, which is the fittest? We must

judge by what we can see. Later forms have not arrived to tell us the answer to our riddle. The reptile seems the most promising form. But the bird fulfills certain conditions better. The whole process of evolution up to this time has tended to the production of muscular forms of swift locomotion. The bird is a high-pressure engine of hot blood and marvelous swiftness, of keen sense organs, and no mean brain. The bird is a far higher and finer form than the reptile. What chance has the plodding mammal about as large and as dangerous as a rat or a rabbit?

We are in tertiary or cenozoic time. The great reptiles have disappeared, only the inferior have survived. Birds, like precocious children, have not fulfilled the promise of their youth. The prize will surely fall to some mammal. There are splendid carnivora, cats or tigers, with powerful bodies and long saber-like eye-teeth. The herbivorous horses and deer have developed long slim legs, and seek safety in flight. The rodents, our rats, rabbits, and squirrels, have taken refuge in holes or have gone into the trees. In the trees we see also lemurs, halfway between a squirrel and a monkey in appearance.

They are, or their descendants will be, "our furry, arboreal ancestors, with pointed ears." Will they ever come down from the trees, and give battle to the tiger? In quaternary time the descendant of the lemur reigns unchallenged and supreme. Even the magnificently molded cat, light and lithe, quick and powerful, keen of eye and scent, and by no means dull of brain, cannot stand against trap and gun.

It is a strange story. Our few illustrations could be multiplied indefinitely. If we have pictured to ourselves the struggle for existence as a mere battle between brutes, where the fittest was always the strongest and largest, we have erred completely. As Mr. Huxley has said of social and ethical progress: "It repudiates the gladiatorial theory of the struggle for existence." [1] In fact the race is never to the swift nor the battle to the strong. There must be some explanation for so strange and unexpected, yet constant, outcome of the struggle. One explanation is evident and of great practical importance.

In paleozoic times vertebrates, mollusks, and

[1] Huxley, T. H., "Evolution and Ethics."

crustacea were all experimenting with the skeleton. The vertebrate developed an internal locomotive skeleton of little use for protection. The mollusk had gained an external, purely protective skeleton or shell. The crustacean followed the safer middle course. Its skeleton was mostly for locomotion, but somewhat for protection.

The external skeleton was easy to build. The cells of the skin of many marine forms secrete carbonate of lime or horn. The covering was likely to vary because external. Every form having a little larger and more effective protective skeleton gained thereby a very tangible and immediate advantage and was fostered by natural selection. The evolution of such an organ goes on very rapidly. The main groups of mollusks, with their most important characters, had all appeared in early paleozoic time.

An internal skeleton, an organ of locomotion, was far more difficult to build. New tissues, cartilage or gristle, and finally bone, had to be formed. The deep-seated organ, being less exposed to varying conditions, varied less. Very slight variations would probably give less advantage in the struggle, and hence were more slowly accumulated through natural selection. For all

these reasons the molluscan skeleton was practically complete, conferring all its great advantages, before the vertebrate skeleton was more than begun. The mollusk had attained very tangible results while the vertebrate was scarcely more than a bundle of possibilities.

The protective shell of the mollusk hindered locomotion, and thus hampered the development of muscle and nerve. It kept the body short and unfit for rapid movement. But muscle and nerve were the two tissues capable of great complexity and high development. They develop through their use in locomotion. The external shell, having few possibilities in itself, and destroying those of other organs, was fatal to any high development of the molluscan type. The evolution of mollusks went on very rapidly at first, and then ceased almost completely. There was abundant variation within somewhat narrow limits, there was easy and sure survival, but there was little progress anywhere. The clam is the logical goal of such an experiment.

The vertebrate skeleton, comparatively simple at first, was constantly improved and additions were made to it. But, only when it had attained a certain size and strength, could it

show its vast advantages over the molluscan shell. Every improvement in this skeleton increased speed of locomotion, stimulated nerve, sense organs, and brain, exercised the muscles, and thus led on to higher and higher realizations and to new possibilities. It was like a mine in which the ore, poor at the surface, grows richer with increasing depth. The vertebrate was sure to be outclassed at first, and equally sure to win in the end.

The experiment of using an external locomotive skeleton culminated in insects. It was suited only for small forms,[1] and thus led to shortness of life, to instinct rather than intelligence. Such a skeleton has far greater possibilities than the shell of mollusks. But its possibilities, especially along the line of development of brain, are necessarily limited. The highest attainments could not be reached by any such experiment. Now that we can see the whole of the experiment, these results, hardly to be foreseen, have become perfectly clear.

The molluscan line ended in the slough of con-

[1] Compare Lotze, H., "Microcosmus," vol. i, Book IV, Chapter IV, "Man-Brute."

tentment, that of crustacea before an impassable barrier, an unscalable cliff. The path of vertebrates, steep and difficult, led ever upward.

The change from water to land brought with it many difficulties and disadvantages. Motion, so easy in the water, was hard under the new conditions. The crawling, helpless amphibian seems a poor creature compared with the darting fish. But life in the air was furnishing more oxygen, was preventing the loss of heat, and was thus raising the temperature of the blood, was leading to a higher and freer life. But at first the disadvantages of the change were more apparent than the gains.

The immediate use of mammalian structure was to insure survival by saving eggs or young. Its grand final advantage was family life and the social life which was based upon this. The marked advantages came late.

Hand and brain are exceedingly complex organs, and are correspondingly slow in their development. It takes time for them to attain and prove their real value. They have vast capacities, but these are realized to only a very small extent in their earlier stages. All these structures of higher mammals, while useful from the

start, point forward to the higher mental and moral powers of a distant future.

But very few vertebrates attained these higher stages and powers. The fish stayed in the water, and not a few amphibians have returned to the life of their fish ancestors. Reptiles remained cold-blooded.

The bird developed a very high temperature of body, marvelous locomotive power, and the keenest sense organs. But in brain it has remained far inferior to the plodding mammal. Perhaps its power of flight kept it largely out of reach of its enemies. The hunted mammal became wary and shrewd.

The highest development of the brain was apparently correlated with the origin and use of the hand and fingers, and the hand was the result of arboreal life. But most mammals remained on the ground, and thus cut themselves off from the possibility of attaining the very highest stage.

It is evident that we must distinguish very sharply between fitness and dominance. The dominant forms, like paleozoic mollusks and mesozoic reptiles, are those which are reaping to the full the benefits of the use of some power

already attained, at the expense or to the neglect of the development of some higher power of greater capacity. They have gained present prosperity at the expense of all possibility of future progress. Such prosperity and dominance must be brief. They are like certain unwise investors who lose their whole capital in the effort to gain a high rate of interest. Such a policy must end in bankruptcy and beggary. The mollusk sleeping in his shell is sure to be surpassed by the form which is investing all its energy of development in some organ of higher possibilities and capacities. The hulking brute of a reptile will in time yield place to the brainier mammal. But, if we focus our attention upon the present alone and close our eyes to the future, the dominant form will almost certainly appear to be the fittest, although its doom is sure and downfall near.

The fittest is the form which keeps up and improves all the attainments of its ancestors, but steadily exercises and develops the organ of highest capacities and possibilities. But such complex organs or institutions are and must be of slow growth. The seed is planted by one generation, and fostered with much pains and

labor by descendants. The real and full harvest is reaped only at a far later time. The development of the higher power or possibility involves necessarily a distinct and often considerable loss or renunciation of present advantage. He who will save, cannot spend lavishly or freely. He who will win the race must undergo training and deny himself certain pleasures. This is evidently unavoidable. It is equally clear that the vertebrate was sure for a time to be overshadowed by the mollusk, and to be driven from the surroundings where life was easiest. The mammal had to be outclassed by the reptile, and the arboreal form by the carnivore. It could not well have been otherwise.

Why, then, did any of our ancestors choose a path which sacrificed present advantage or comfort to future attainment? They did not choose at all. Every one of them followed the line of least resistance for him. The primitive vertebrate kept swimming because those who went to the bottom were eaten up by crustacea or mollusks. The swimming habit occasioned the development of an internal skeleton and made an external skeleton impossible until a much later time.

The mammals who kept on laying eggs lost so many young that nearly all of them have become extinct. Birds and reptiles hunted the defenseless mammal until they taught him to become agile and wary. Carnivora developed. Life became very unsafe for all inhabitants of the ground. Some sought safety in flight, some in holes in the ground. Our ancestors were slow of foot, and could not or would not dig; they had to climb. Very probably they had some innate aptitude in this direction. But, morally speaking, the carnivora "boosted" them into the trees by eating up all those who remained on the ground.

Nature's system of education is very simple. She puts the animal under conditions where it must die or form the habit which will insure the exercise of the highest powers and the development of the highest organs. Many fail and die. Some at least form the right habits and attain the next higher stage. Here again the same process is repeated.

Such a system of education is severe and unsparing. Just when our ancestors were beginning to reap and enjoy the advantages of muscle, she urged them on to develop a skeleton. They

were content and well fed in the water, but they were crowded out on land. When they were beginning to fully enjoy life on the ground, they were driven to a new mode of life in the trees. She treated them much as Poor Joe in "Bleak House" complained that Detective Bucket treated him: "He always kept a-chivying of me, and a-telling me to move on."

The chivying process seems necessary. When a group of animals has remained for a time under conditions where struggle and effort are unnecessary, further development seems to become impossible for them. Apparently for this reason, through lack of the spur of necessity, groups have straggled and fallen out of the march, and stopped all along the line of advance. Life seems like wet plaster. As long as you stir it vigorously, you can mold it as you will. Set it down for a moment, and it hardens into a useless mass.

This pressure of adversity is needed not only to prevent the individuals of any group from straying into tempting bypaths and to hem them in to the line of progress. It is essential to the complete development of the individual. It has been well said that the surroundings which are

most favorable to progress are those which offer the greatest number and variety of stimuli which will continually call into action all the powers of the individual. A life of ease means lack of stimuli, and hence the full development of but few powers. Power and efficiency come only through vigorous exercise, and strength through struggle. The obstacles may be so great that it is almost or quite impossible to overcome them. But development can come only through the continual testing and training of the growing power and through compelling it to accomplish to-day what was impossible a year ago. The spur of necessity is the beneficent as well as the essential element in the education of races and individuals, of animals and men.[1]

But why did not some ancient cat develop muscle, tooth, and claw as long as these were highly profitable, and then proceed to put its energy into the development of a thinking brain? No cat ever did this, otherwise you and I would probably have not been here. Nature seems to say to every group of animals: "Try whatever

[1] See Orr, H. B., "A Theory of Development and Heredity," p. 248. Wallace, A. R., "Darwinism," close of book.

experiment you will, along any line whatsoever. But when you have begun, you must follow that line to its end. There is to be no turning back." An illiterate but wise minister once said that the most important text in the whole Bible was: "They got going, and they couldn't stop."

Yet nature's severity is really kindness. She is continually spurring her favorites to a higher and keener enjoyment. Rest is not inactivity. Idleness is unendurable to the healthy. Exercise of a normal kind and degree of any organ always brings pleasure. The higher the power exercised, the higher the joy. This is one reason why the motives peculiar to each higher plane of life supersede and dominate those of the lower. They lead to the exercise of a power giving keener enjoyment.

Our study of fitness leads us to the same conclusions as that of the logic of evolution. Life is ever advancing from plane to plane. It progresses by the rise of higher and higher powers which only slowly gain supreme control in the body. The higher power is at first feeble, and seems of comparatively small profit. So muscle in zoöphytes, brain in early vertebrates, morals in earlier centuries or millennia of human history,

and religion to a large extent to-day. But this nascent power must be developed at all cost, if the form is to pass from any lower stage of life to the next higher. Making the most of those powers only which are already firmly established or ruling in the body leads to temporary dominance, but to final degeneration or extinction.

The progressive animal or man must cultivate steadily the powers which have raised him from the next lower stage. He ought to cultivate these by some higher exercise or in some worthier form than ever his ancestors have done, if he is to progress. The powers which most clearly distinguish man from the lower animals, which have made him what he is, are evidently moral and religious. But there is evidently an almost endless series of planes of moral and religious life. The progressive portion of the human race can never be content with the moral standards or religious visions and attainments of its near or remote human ancestors. It must press on to higher standards and attainments. This is merely a truism. But a truism is usually a truth which we have forgotten or neglected. If this statement be accepted, other conclusions and results necessarily follow. Some of these

are of great practical importance, and we must give them our careful attention.

Socrates is being entertained at a banquet in the house of Gorgias. The conversation turns first on rhetoric, then on justice, and finally on life. Callicles has exhorted Socrates to practice the art of dealing with realities, and that which shall gain him a reputation for common sense; and to emulate, not the men who spend their time in probing insignificant questions concerning truth and justice, but rather those who possess means and reputation and all the other good things of life. He has assured Socrates that the end of all his work will be sentence in the courts and death by the vote of his fellow-citizens. One after another Socrates silences all his opponents, and ends the discussion with a statement of his own belief.

"So, bidding farewell to those things which most men count honors, and looking onward to the truth, I shall earnestly endeavor to grow as far as may be in goodness and thus live, and thus, when the time comes, die. . . . Beyond all else a man must take heed not to seem but to be good in public and private. . . . The best way of life is to practice justice and every other vir-

tue, and so to live and so to die. This way then we will follow, and we will call upon all other men to do the same; not that way which you believe in and call upon me to follow; for that way, Callicles, is worthless."

It is only the old story in a new form. Callicles's philosophy is reptilian. Socrates, looking away from the immediate and tangible, is following in the line unconsciously trodden by all his progressive ancestors throughout the ages. The old law of fitness is unchangeable and irreversible. Man must focus his attention and will on the development of the powers of unlimited capacity and possibilty. Otherwise he will surely degenerate. He must be willing to renounce certain present advantages. It is merely what all his ancestors have done before him. He must face the ridicule of the molluscan philosophers. There is much of the philosophy of the clam abroad in the world to-day, though its original source is usually unknown or unrecognized. The goal of evolution lies far in the future, distant, and often dim. We must keep our eyes fixed steadily upon it or we shall surely stray. There are many paths which seem right in men's eyes whose end is death.

By what power or virtue does a man renounce certain real and desirable present advantages and struggle toward a far-off goal which is only dimly discernible, and so distant that he can never reach it? This vital question will demand our attention in the next chapter.

CHAPTER VI

EVOLUTION AND FAITH

OVER the doorway of Professor Haeckel's lecture room in Jena stands the motto: *Impavidi progrediamur* ("Let us go forward without fear"). Every upward step in evolution has been, and always must be, an experiment concerning whose success more or less doubt is inevitable. Would muscles or larger digestive organs pay better in primitive worms? Was the internal skeleton of the primitive vertebrate or the flexible mail-coat of crab and insect the wiser investment? Only time could tell. The problem had to be solved by experiment. But the experiment lasted through ages, and the solution was long delayed.

But long and patient waiting and delay in the solution of the problem are not the only or the greatest objection and difficulty which the fittest have to face. It is evident that they cannot hope to reap during their lifetime any large share of

the results of their fitness. These are reserved for their descendants. All the disadvantages, hardships, and losses of their experiment become apparent quickly. The gains and advantages are mostly in a far-off future. This also is inevitable. The fittest have developed only through the hard training and testing of all their powers. They are always graduated from the school of adversity with its hard and healthy stimuli. Meanwhile, the dominant form is easily reaping a full harvest of present, evident, and tangible gain. His descendants long afterwards pay the penalty of his mistakes. But he and his contemporaries will live to see only the advantages. Past experience reviewed by human intelligence casts light on the path of future progress. But the goal of attainment toward which we must march lies in a distant future always dim and uncertain.

Says Professor James: "In all ages the man whose determinations are swayed by reference to the most distant end has been held to possess the highest intelligence. The tramp who lives from hour to hour; the Bohemian whose engagements are from day to day; the bachelor who builds for a single life; the father who acts for

another generation; the patriot who thinks of a whole community and many generations; and finally the philosopher and saint whose cares are for humanity and eternity—these range themselves in an unbroken hierarchy." [1]

But Professor James suggests, if he does not emphasize, a second series of equal importance. Man is a social being living in families and communities. These larger units also, through their effects upon their members, are tested, and fostered or destroyed, by the process of natural selection. There is an increasing tendency, as we have seen, to diminish competition and to increase mutual aid by the combination of smaller into larger groups. The man who works for the establishment and betterment of these larger units is putting his efforts in line with the trend of evolution.

Hence we may say that the intelligence of a man is measured not only by the distance of his ends and goal, but also by the size of the social unit whose good he serves. The selfish individual, thinking only of himself; the father who cares only for his family; the good neighbor;

[1] James, W., "Psychology," New York, 1893, p. 101.

the faithful citizen in the smaller or larger community; the patriot who seeks the welfare of the nation; and the philanthropist to whom nothing human is foreign, and who seeks the good of all mankind—all these form a hierarchy of broader sympathy and love, and of ever widening influence. The broader the field of one's efforts, the larger the group for which one works, the more distant the goal. Only patriot and philanthropist really have immortality. The two series or hierarchies are in general parallel or converging. A man of high rank in the one will hold a similar position in the other also. These laws of human history are really one aspect of a grander law of biology, of which human history is only the last volume or chapter.

Animals and men have always followed one of two lines of action and life. Dominant forms have utilized to the utmost powers and structures already largely attained by their ancestors, whose supreme usefulness as ends has culminated and is declining, and which offer the largest immediate return. They have lived for present conditions and surroundings, have conformed completely to these. They have gained present

prosperity at the cost of future progress and survival. For, when conditions change, as they surely will, the dominant form pays the penalty of extreme adaptation and over-specialization.[1] The dominant human form is almost necessarily selfish. Selfishness and sin are the supreme blunders and follies.

The fittest have developed the power of greatest capacities and largest possibilities. They have always kept open the door to future progress. Toward this they press. They have assured future success and the supremacy of their descendants at the loss of many very real advantages and in the face of difficulties and hardships. Their experiment must always seem doomed to failure in the eyes of the superficial observer. Arguments in its favor must sound unpractical and quixotic. Future generations demonstrate their wisdom and true success.

We have seen that the fittest animals followed the upward path through no choice or superior intelligence, but only under severe pressure. They were shut up to it, and crowded into it.

[1] Cope, E. D., "Primary Factors," p. 172. "Law of the Unspecialized."

It was practically the only path left open to them.

Man must follow a very similar path, but in his struggle to realize his possibilities he must act consciously and of set purpose. The possibilities are grand and inspiring. Evolution is full of promise to every thoughtful man. The fulfillment of the promise belongs to a future whose distance and breadth measures the wisdom of his choice.

Every stage in the evolution of man has been useful in proportion to the value of the contribution which it could make in progress. Cœlenterates contributed a stomach; worms and lower vertebrates, sense organs and muscles which made possible stronger and quicker and finally more precise movements. Each stage aided according to its ability in building the brain. Higher mammals laid the foundation for the human family and society. Each stage has its own place and work which it alone can do. Each successive contribution, proportioned to the powers of the stage which made it, was larger, higher, finer, more complex, required a longer time for its realization, reached farther into the future, and gave vague promise of some-

thing still better to come. This made each successive experiment more difficult and hazardous, as well as more beneficent.

Present man must make some still grander contribution to human evolution, one proportioned to his powers and stage of life, along lines largely unattained by any animal, and far beyond the understanding of primitive man. Intelligence must develop; but it must be an intelligence which gives a clearer vision and knowledge of social, moral, and religious truth and law, and which will furnish ideals and motives for progress along these lines. Intelligence or education which merely increases comfort and ease and removes obstacles, but does not inspire and strengthen men to face new difficulties and hardships, to win new battles, and to attain a higher, broader, and more serviceable life, must end in degeneration. Knowledge will increase. But it must be a knowledge worthy of the human plane of life, furnishing motives worthy of human beings, and thus aiding man slowly and patiently to realize his highest possibilities.

The fittest must take the risk of making the highest ideals, aims, purposes, and powers supreme in life, and sternly subjugate all lower

aims and powers to be means to these higher and worthier ends. The experiment extends into a distant future, and others reap the rewards of their efforts. They can only hope. Yet they must beware of rushing blindly after every hope and promise held out by visionaries. Their confidence must have a foundation in past experience and progress.

They catch a glimpse of some great human good not yet attained. A higher moral tone in the life of individual, family, or society; better conditions and larger opportunities for their less fortunate fellows; a purer and nobler church or state; in one word, some betterment of human life—is greatly needed and worthy of all their efforts. But is it possible, practicable, attainable?

The promise is anything but clear and precise. They can as yet describe it to others only in general and vague terms. Attention, thought, and hard study must be focused on these vague promises until they acquire a definite meaning. Thus to fix the attention for months and years requires a firm purpose and a stout heart and will.

While they are gazing into the future, present

advantages are slipping from their grasp. Socrates has to "bid farewell to what men count honors," and Agassiz, in his pursuit of science, "has no time to make money." Callicles is continually exhorting them not to waste their time and powers on insignificant questions, but to think of something practical.

Still they persist in their thought and study, and slowly the promise gains definite form and content in their minds. The vision of a higher life and better age dawns clear before their eyes. It thrills and inspires them. They look forward to its speedy and full realization with eager anticipation. They choose it as the reward of all their efforts. They will take joy and hardship, good and evil of the quest with "frolic welcome." They are young and strong, and life is long.

But the goal is far more distant than they have thought; obstacles hinder or block their progress. They have to contend against active opposition and passive inertia, against unwillingness to think, indifference and moral paralysis of friends, and against keenness and vigor of opponents.

They find that attainment of the goal and

realization of the vision are not for them. They can make only a small attainment and slight contribution not unmixed with evil. Their chief reward is the strength and joy which spring from struggle. Conscious of their powers they know well the rewards which they are letting slip though within easy reach. They know and feel the strength of these temptations. The fittest must be men and women of unconquerable purpose and iron will. Behind this purpose and will there must be deep and intense feeling born of attention, thought, and long study, mingled with broad sympathy and strong scientific, constructive imagination.

The fittest have been well described in the closing words of Professor Huxley's remarkable lecture on Evolution and Ethics.

"We have long since emerged from the heroic childhood of our race, when good and evil could be met with the same 'frolic welcome'; the attempts to escape from evil, whether Indian or Greek, have ended in flight from the battlefield; it remains to us to throw aside the youthful overconfidence and the no less youthful discouragement of nonage. We are grown men, and must play the man

'strong in will
To strive, to seek, to find, and not to yield,'

cherishing the good that falls in our way, and bearing the evil in and around us, with stout hearts set on diminishing it. So far we all may strive in one faith toward one hope:

'It may be that the gulfs will wash us down,
It may be we shall touch the Happy Isles,
——— but something ere the end,
Some work of noble note may yet be done.'"

A briefer and more profound description of the fittest was written by a great thinker almost two thousand years ago. He had pondered on the history of his nation, and especially of its greatest leaders. He marshals a glorious array of great souls. There are patriarchs and prophets, berserkers and statesmen, men of different times and civilizations, leaders in war and in peace, differing altogether in wealth, social position, mental traits and endowments—all heroes. Beneath all these vast differences he finds one essential, fundamental agreement, the common root of all their forms of greatness. He states it as follows:

"All these died in faith, not having received

the promises, but having seen them afar off, and were persuaded of them, and embraced them, and confessed that they were strangers and pilgrims on the earth." Through this faith "out of weakness they were made strong, and waxed valiant in fight."

Everyone saw a promise, everyone had his own vision, no two exactly the same. Everyone saw it at first dimly and afar, but kept looking. He was not superstitious or credulous, but never indifferent. After patient, careful attention he became persuaded. The promise, which was so dim and vague to others, had become clear and cogent to him. He usually felt that he was the last and least fitted of all to realize it; but, if no one else would, he must. He gave up all for its attainment, accomplished great things, but died before its realization.

Faith is not acceptance of outgrown and outworn superstitions. It is far more than belief; more even than the working hypothesis of a great soul. It demands and includes strength not only of intellect, but of heart and will. A tough, vigorous body is almost a prime requisite for its existence and endurance. It exercises all the powers of the whole man. It is an exceed-

ingly virile virtue, and tests and measures manhood. A truly great man is characterized by a great faith. A man of strong faith is a strong man through and through. A man of weak or little faith has a weak spot somewhere or is weak throughout. Only faith can ever lead a forlorn hope, for to the faithful the hope is never forlorn.

Above all, while those who are content with present and temporary dominance may walk by sight, the fittest must walk by faith fearlessly into the future. Without faith progress is impossible, and evolution becomes but another word for stagnation and degeneration which fits only for ultimate extinction.

There are three critical periods in the development of every individual. Childhood is the time when home and school must develop the strong, tough body, and insure physical health. Youth continues the physical development, maintains and increases vigor, and adds the vision of high ideals. It is the period of the rise of the truly human powers. We have seen its critical importance. The centers and sources of education are the home, the school, and the church.

Young man and maid have united to form a family, and with high hopes and ideals go forward without fear. The cares of life thicken. The father has to earn and provide house and livelihood, the young mother must make a home and care for the household. Actual life is very different from their expectation. It seems like a monotonous and humdrum round instead of a swift advance. The goal of their hopes is far away, and seems to recede. Progress is very slow. Young manhood is the period which furnishes the most ardent pessimists and many of our reformers. They are learning that the most useful thing in life is the ability, not to fly or to run without wearying, but to "walk and not faint." This is the critical question: Will they keep on walking when they can no longer run, or will they faint? Their wills are being trained to endure and overcome—the hardest and most important lesson of life. But the glory of the struggle is hid from them; what they see is mainly the rough back of the pattern which they weave.

Whether they will hold out depends primarily not on their wealth, learning, or present success, but on the persistence of their faith. If

faith fails, all is lost. Here home and school can help no longer. Only the church remains as the center of this highest education in life. They need instruction. They need far more hope, courage, power, inspiration, the true interpretation of the riddles of life and the world, the meaning and value of their training, mutual aid and support, the encouragement of hopeful elders, the inspiration and contagion of the life of great souls of all ages. They must form the habit of viewing the commonest things of common life from the standpoint of the distant goal and end, and thus to become intelligent.

When Pilgrim had been refreshed and instructed in the Interpreter's House and had set out for the Delectable Mountains, he straightway descended into the Valley of Humiliation. Here the distant view was lost, and clouds and mist settled down; he found pitfall and snare, bog and mire, battle and wounds. He was hard put to it. Christiana passed that way later, and is told by Greatheart that that valley is "as fruitful a place as any the crow flies over." Happy the man or woman who has a Greatheart for a guide, and Hopeful, Valiant-for-truth, and old Honest for companions through that valley.

Through it they must all surely go, if they will reach the mount of attained vision.

But once more we must examine carefully the foundation of reason or experience on which the persuasion of faith rests. Once again we must ask: Does the man who fixes his eyes and stakes his life on an experiment based on a social, moral, or religious promise, build on something secure, or on unreliable dreams and groundless hopes? This question will occupy our attention in the next chapter.

CHAPTER VII

RACIAL EXPERIENCE

THE fittest are evidently those who devote their energy and effort primarily to the development of the highest powers of greatest capacity and promise. The ancestral attainments are neither suppressed nor neglected. Digestion and muscular power, shrewdness and practical wisdom, all are kept at their best, but always subordinated to the service of the still higher power or faculty not yet fully enthroned and supreme in the race or the individual. The fittest hold fast to the best in the past, but, being progressive, look toward and into the future. Without such men and women evolution is impossible and stagnation sure.

Faith is at least nothing less than the working hypothesis of the life of a great man. The greater the man, the higher and farther removed the goal of his life and efforts, the more unat-

tainable his ideal and the grander his faith. He cannot seize and utilize all the possibilities of the present and the future; he must give up some very real and tangible present advantages if he will "look onward to the truth." Is such faith unscientific and unreasonable, or has it some sure foundation—as sure, perhaps, as that of our knowledge? This is the vital question which confronts us.

Experience is the best teacher. "The burnt child dreads the fire." The child in his plays is experimenting with himself and with the world —with life. Thus he grows in strength and knowledge. Family life gives him the benefit of the experience of his ancestors. History records for him the experience of past generations.

Through experiment and observation we learn many facts which seem to us almost incredible. The chemist tells me that water is composed of two volumes of hydrogen and one of oxygen; that of these gases one burns readily and the other supports combustion. I know that water quenches fire. He tells me that quarts of gas are compressed or united in a few drops of water. I refuse to believe him. He proceeds before my eyes to unite the gases into

water, and to break up water into the gases. I am convinced of the truth of his statement. Similarly I grow wise in life by trying experiments and by watching the experiments of others.

Some one tells me that a carp or crow will live to be one hundred years old. This statement can be proved or disproved by experiment. But it will take a long time. The man who starts the experiment will not live to see it finished. Many or most important experiments affecting human life and happiness require more than one generation for their completion.

Many experiments which affect social life demand the coöperation of many men through long periods. Is slavery right or wrong, beneficent or maleficent in modern civilization? We are not asking now whether in prehistoric times it was better than putting captives to death. The question was settled by the clash of civilizations, by experiment more than by argument. The free civilization outpopulated and outgrew its rival. It cost thousands of lives and millions of money to settle that question. But the solution will stand. The experiment has been tried many times under varied conditions. We do not need to try it again.

This much seems clear. Certain, even very metaphysical, statements have a direct influence on our lives and change them for good or evil. Whether Calvanism was good or bad, it could "set up a line of battle." So could Mohammedanism. Moral and religious creeds have molded men's lives and habits. This is indisputable. Even Mr. Haeckel freely grants that our religious creeds have done much harm. They seriously affect life, and are anything but negligible quantities.

If the system of thought molds men into conformity with environment, they will survive, and the creed will endure and develop with them. Even nations superior to them in physical power or in martial discipline and prowess may be won over to accept it from them. If the creed or theory molds men into conformity with environment, it must be because it corresponds to or embodies objective reality in at least a very fair degree; it must be in the main an approach toward truth, if not truth itself. If the creed or theory leads to nonconformity to environment, the race will perish sooner or later and its creed be forgotten. Thus moral and religious creeds and systems are slowly tested and verified

or disproved by actual racial experiments. The results are recorded and handed down as the verdict of history.

You may say that natural selection is not as effective in man as in lower animals. There the fittest survives. But fit and unfit men survive alike. The unfit individual keeps alive the unfit creed or system. Thus the means of verification which apply to animal appetites lose their efficiency when applied to human beliefs. This may be true to a certain extent. But while in individuals and families natural selection acts somewhat more slowly, it is not at all certain that it acts any less surely. But a system or mode of thought characterizes nations and races even more really than individuals. And the competition and struggle for existence between rival races and civilizations, even when silent for a long time, is waged even more relentlessly than the battle between rival carnivora. Here natural selection works as relentlessly as ever, and the fittest civilization characterized by modes of thought best conformed to environment, and therefore nearest the truth, is bound to survive and to impress its creed on future generations.

This does not mean that "whatever is, is

right." But whatever has persisted and strengthened through past ages, whatever has stood the storm and stress of time since man arose on the globe, whatever has survived in widely different races and civilizations and under widely differing conditions—this, as it seems to me, has been sufficiently tested. It has been verified by the grand experiment of life, and has won the verdict of history. It must survive.

Conceptions of God and duty, of loyalty and fidelity, of heroism and unselfishness, have in one form of clothing or another come down the ages of human history. Wherever man has tried the experiment of life and survived, much more if he has at the same time advanced, these conceptions have held their ground and grown and improved, and have strongly molded life and character. In some form or other they are practically universal. The religious systems of savages are hard to discover; they are not talked of before strangers. We easily misunderstand them. But we are continually discovering them where their existence has been denied. Man is a religious being, explain it how you will. A second fact is that these moral and religious conceptions are the mental furnishings or characters

which most sharply distinguish man, and have raised him above the unmoral and irreligious lower animal. They, not an opposable thumb or ounces of brain, are the real human characteristics. It is certainly reasonable to expect that they will dominate progressive man in the future as they have raised him to his present condition.

In our study of the origin of family and social life we have seen that these conceptions of duty and unselfishness are rooted in and sprang from mammalian structure. May we not say that in a sense they have become incarnate in the human brain? Let us look into this question a little closer.

The young bee does not need to be taught how to build a cell; he inherits the tendency and most of the necessary knowledge. The same is true of a host of other instincts. The shepherd dog and the bird dog brought up in the house apart from birds and sheep went, the one after the sheep and the other after birds, as soon as turned loose in the fields. The stimulus of the appropriate object was all that was necessary to rouse the slumbering inherited instinct in the brain.

Instinct is inherited, but intelligence is the re-

sult of experience, observation, and thought of the individual. But the capacity for intelligence is inherited. Some men are born with great and some with limited capacities. These tendencies and capacities will be modified to a certain extent by surrounding conditions. But we shall not go far astray if we consider them to be mainly the result of heredity.

These inborn capacities vary not only in amount but also in quality. Some men, we say, are born mathematicians, linguists, artists, or inventors. We mean that they have large capacities along these special lines. The whole of the political or theological creed of some men seems to have been inherited. They were born Republicans or Presbyterians, and no earthly power can change these tendencies.

Certain tendencies or modes of thought become so marked in a community or nation that they are recognized as racial characters. Thus the Jewish race has been characterized by its capacities along the lines of business and religion. It has never been especially artistic. The Greeks were æsthetic, but did not make a great success of morals or religion. We speak of the canny Scotchman and the shrewd Yankee. We

may easily mistake in our characterization, but we recognize that different races have different inherited capacities and tendencies.

The fixedness of a tendency is roughly proportional to the length of time during which it has characterized the race. One well-fixed tendency will modify to a large extent all our modes of thought and our views on all questions. It gives us the standpoint from which all problems are viewed and studied.

But early environment aids the fixedness and spread of these tendencies and habits of thought. The young child is exceedingly imitative, and almost as open to suggestion as the hypnotized patient. The mother, busied and burdened by cares of home and household, regrets that she cannot do more to educate her children. She forgets that her industry, fidelity, cheerfulness, poise and steadiness, hope, courage, faith, reverence, calmness, kindliness, and courtesy are all reproducing themselves in their minds and hearts. The child, left to nurses, acquires the virtues of a faithful servant or the vices of a hireling. What the child learns from books by application and mental effort is the smallest part of his acquisitions. He absorbs almost or quite

unconsciously. He has learned to talk by imitating his elders. He acquires at the same time their peculiarities of dialect, idioms, pronunciation, and inflection. These acquisitions crystallize in habits of speech.

In later life he becomes conscious that some of them are bad. He avoids the unfortunate habit or idiom, and is on his guard against it. But as soon as he relaxes his vigilance and becomes his real self, he will surely return to it. Not only habits of speech and action, but preferences and aversions, prejudices and superstitions, æsthetic and moral standards, and even religious tendencies, arise and grow and take form as the result of surrounding conditions, he knows not how. But these habits of thought, speech, and action soon become fixed and unchangeable, and fashion his whole life. They have become so deeply rooted that he believes that he has inherited them. He cannot imagine himself without them. They are an inheritance, but not innate. He was not born with them; they are the result of early environment.

The best-nurtured family of children has gained thus an "out-populating" power, to borrow Dr. Bushnell's expression. He says:

"Qualities of education, habit, feeling, and character have a tendency always to grow in by long continuance, and become thoroughly inbred in the stock. . . . That which was inculcated by practice passes into a tendency, and descends as a natural gift or endowment. . . . A race of slaves becomes a physiologically servile race. And so it is in part that civilization descends from one generation to another. The civilization is in great part inbred civility.

"The populating power of any race or stock is increased according to the degree of personal and religious character to which it has attained. Good principles and habits, intellectual culture, domestic virtue, industry, order, law, faith—all these go immediately to enhance the rate and capacity of population. They make a race powerful, not in the mere military sense, but in one that, by century-long reaches of populating force, lives down silently any mere martial competitor. Any people that is physiologically advanced in culture, though it be only in a degree, beyond another which is mingled with it on strictly equal terms is sure to live down and finally to live out its inferior. Nothing can save the inferior race but a ready and pliant assimi-

lation." These are only scant extracts from the remarkable essay published almost fifty years ago.[1]

Thus in many ways these grand conceptions of duty, fidelity, heroism, and unselfishness tend to become more and more deeply ingrained in the life and structure of the individual and of society, and to spread and gain a universal sway. Because of our deep confidence in these truths and their practically universal acceptance in some form and to a greater or less extent, some have compared them to axioms.

"At the end of every demonstration," says Mr. Fiske, "we must reach an axiom for the truth of which our only test is the inconceivability of its negation." But why cannot I conceive of the negation of an axiom? Says Mr. Fiske again: "Our minds being that which intercourse with environment has made them (both their own intercourse and that of ancestral minds), it follows that our indestructible beliefs must be the registry of that intercourse, must be necessarily true, not because they are independ-

[1] See Bushnell, H., "Christian Nurture," Chapter VIII, pp. 202, 207.

ent of experience, but because they are the only complete unqualified expression of it." [1]

I believe that a straight line is the shortest path between two points. I cannot demonstrate this, if you wish to deny it. But I cannot conceive of the contrary or negation of the statement. One good and sufficient explanation of this fact is that the invariable experience of all my ancestors from fish, or even worm, upward has been that it was shorter to go straight across than around. If any animals persisted in going around, they failed to " get there " and did not survive. This may not be the only explanation. Experience may not be the sole source of knowledge. But it is one source, and the experience of the ages becomes impressed upon the very structure of the brain.

To be axiomatic a truth must be accepted by everybody except the insane and the incapable. They are not bound to accept anything, and are in this sense exceedingly liberal and broad-minded. Indeed, some men have such broad minds that they can hold at the same time conflicting and mutually destructive views. The

[1] See Fiske, J., "Cosmic Philosophy," pp. 59, 65.

existence of a God and the claims of duty are considered by some as axiomatic. This they can hardly be, for they are not acknowledged by some capable, thoughtful, and apparently sane men. They may be in a fair way to become axiomatic, and future man may thus regard them.

We have seen how the life of the primitive tribe educated men to ideas of right, duty, heroism, and God. For, in the struggle for existence between tribes, that one survived which had these instincts, if I may so call them, most deeply rooted and strongly developed, or which most readily accepted them from others and made them their own. Human experience, therefore, through long ages, in all times and places, under the most varying conditions, has tested them and proven their value and truth. They have become a part of the furnishing of the human mind. They always will and must be reckoned with, whether we will or not. We may neglect them or banish them to the most remote corners of our minds, we may try to forget them. But they stay with us to curse if we refuse or neglect to call them in to bless.

Of course these conceptions are not present full-blown in the mind of the child. Put hydrogen and oxygen together in a receiver. There is no water there, but pass a spark through and there will be. The molecules of the gas will leap together in liquid drops. Where are the leaves, branches, and acorns in the germ of an oak? Keep the germ under proper conditions and environment will call all these forth in due order and season.

So in the brain of the child the combinations are all prepared, and the stimulus of a proper environment will call forth the conceptions. In the embryo the rods and cones of the retina of the eye are all formed in complete darkness, as also the nerve paths along which the vibrations called forth by the light as yet unknown will travel to form images in the brain. The child opens its eyes and sees the world, though dimly and partially at first. No images reach the brain, only vibrations pass along the optic nerve. It required thousands of years for the worm to develop an eye capable of forming an image and a brain capable of translating the vibrations of the nerve. The infant learns all this in a few hours or days, if he needs to learn it at all.

Its brain has already been prepared to respond to the stimuli of the light vibrations by forming an image in the mind.

Something in the very structure of the child's brain leads him to accept the grand generalization that like causes will produce like effects long before he knows anything about cause or effect in the abstract. He does not need to burn his fingers more than once or twice to learn to always let hot things alone.

When in all times and places men awaken to some conception of some kind of right and duty and of God, when all these conceptions, however different in many respects, always agree in certain fundamental characteristics, is not the presence of a certain mental structure, waiting to be awakened by the touch of something real in environment, the most natural explanation of so grand and surprising a fact?

But our religious beliefs, and our moral beliefs in only a less degree, will become axiomatic only in a very distant future, if ever. It never suits my inclination or my interest to deny an axiom of mathematics. Why should I ever care to do so? But, unfortunately, it frequently suits my inclination and sometimes my immediate

interest to forget or stifle or fail to hear the claims of God and duty. They are often unconventional and inconvenient articles of mental furniture. We may prefer to think or talk of them as little as possible.

These sometimes inconvenient and disagreeable conceptions which are not axiomatic, but which are so interwoven with the fibers and stuff of my brain that I cannot tear them out, are what I will call convictions. They are inherited results of racial experience. They have stood the test of life, and have won the favorable verdict of biological history. They have made man what he is. If we are to progress they must dominate our minds. If our civilization survives it will be because it is the most adequate and complete expression of these conceptions. They are our most priceless heritage.

Wealth and social institutions are instruments for their use and spread. Intellect and learning tell us how their ruling motives may best find expression and how their ends may be attained. They alone can give any unity to the life which they must permeate. Without them the energies of life dissipate like steam from an open vessel. They never fail us. When in the storms of life

everything else—fortune, friends, opinions, and beliefs—has gone adrift, they remain. We lose them only with our lives, if even then.

When these are supreme, men and civilizations are at their best. Think of the Jews under the Maccabees, of Holland under William the Silent, of England under Cromwell, of Bohemia under Ziska. In every case the leader incarnated the convictions which stirred and inspired his followers. Great social and political movements owe their strength to the fact that they appeal to the convictions of the people. They may, or may not, appeal to their present interests. The statesman takes this into account while the politician is busy counting or buying votes. Whoever said that a statesman was only a dead politician must have been a staunch Universalist. But the thought adds to our longing for more statesmen.

The successful orator is he who can appeal to these convictions. Mr. Everett was a great orator, and his oration at Gettysburg was no mean effort. How many of us remember what he said? Mr. Lincoln added a few words. He spoke out of the full heart of a great patriot, and appealed to the deepest convictions of every citizen

of the land. No one can forget that he spoke or what he said.

What was the source of Mr. Wendell Phillips's power. Not his logic, for he had none. Much was due to his silvery voice and marvelous dignity and grace of bearing. He owed more to his classic culture, to the purity and clearness of his style, to his power of calm and withering sarcasm. These helped with the country people to whom he loved to speak.

But others had these powers in only less degree. He spoke straight to the convictions and hearts of the folk, and they arose and followed him. The man who can thus speak does not need to drag or compel them. They are eager to follow. He "speaks with authority, and not as the scribes."

We say of a great poem or other piece of literature that it is universal. We mean that it embodies the experience of all times and places. It appeals to our common store of convictions.

Teaching is not the addition or superposition by the teacher of a new thought or conception or bit of knowledge on top of the old ones formerly possessed by the pupil. For if the

thought is imposed from without it will probably be and remain "new cloth on an old garment." It remains a patch, something foreign. The new thought must be a growth, stimulated, indeed, by the teacher, if it is to form any real part of the pupil's mind and life.

Learned and often far-seeing men frequently fail of influence in the community just because they strive by sheer weight of learning or argument or by dialectic skill to force a new thought upon the minds of their fellows. They try to make them see something which they have never seen before. They fail ignominiously. People object, very wrongly undoubtedly, but universally and naturally, to be conquered by weight of argument or skill in logic. The new truth does not fit in well with the conceptions already in possession of their minds. Even if lodged in the mind as a persuasion, it remains foreign and bears little fruit.[1]

Socrates had a far more excellent way. When he would open men's minds to a new thought or truth or their eyes to a grander vi-

[1] Cf. Stevenson, R. L., "Familiar Studies, Walt Whitman," Chapter I, close.

sion, he never tried to impress this upon them as something new and strange. He led them to see that the new thought or vision was really included in what they already knew, or a natural outgrowth from the old. If the hearer was honest, the new truth was heartily welcomed, became an integral part of his thought, and modified all his modes of seeing and thinking. The man whose life and work is based upon these convictions which have crystallized out of racial experience can afford to be tolerant. Intolerance characterizes the opinionated man, not the man of strong convictions. Indeed, the two are totally unlike. Our strong man sees that at the bottom of every great social or political movement there always has been and always must be some grand truth, with however much error it may be mixed. He knows that the supporters of the new doctrine must hold the same fundamental convictions with himself. He suspects that the new party has arisen because his own has forgotten or neglected some important truth or aspect of truth. He may be a staunch Republican, and yet refuse to believe that all Democrats and Socialists are knaves or liars. He may be and ought to be very intolerant of

error, and yet very tolerant toward his fallible neighbors. He sets himself to find out what is the new or forgotten truth which the opposing party is emphasizing. When by careful analysis and study he has found it, he works with patient wisdom to embody it in the views of his fellows.

He hears continually that some new heresy is undermining men's confidence in all the old arguments for great truths; that men will soon cease to hold the old truth; that religion and morality, church and society, are all going to the dogs together. He recognizes that the convictions on which religion and society rest are the result of racial experience, and that they are indefinitely older than the arguments by which they are now supposed to be supported. The arguments may change or disappear without affecting one particle of the strength or truth of the conviction. "Nothing," says Balfour, "so quickly waxes old as apologetics, unless, perhaps, it be criticism." [1]

Our man of convictions sprung from the experience of the ages sees a wave of insanity pass

[1] Balfour, A. J., "Foundations of Belief," p. 226.

over the country. People seem to be going mad, and to be forgetting all wisdom or decency. He knows that the old racial convictions have outlasted many a similar storm. Other things—prosperity, credit, fortunes, theories, opinions, and beliefs—may be wrecked or vanish, but these old fundamental convictions will regain their supremacy; from these all else will arise anew in fairer form. He can be hopeful when others despair. Time and he are two.

He is patient and does not make haste. He does not hope to revolutionize the world to-day or to-morrow. He would not if he could. Time and he are more than two, for environment with all its forces is on his side. "The stars in their courses fight for him." He does not wish to implant his own beliefs full grown in the minds of his neighbors, but rather that they should develop their own. He prefers to sow the seed and let it spring. He rejoices in the blade and growing ear, and knows that the full corn will come in its own time. If wise, he does not attempt to force the growth, while he encourages and fosters it with every means in his power. He can afford to wait.

Finally, a man who has strong convictions and

thus a clear vision of the ends of life, who works toward these ends patiently, steadily, without haste and without discouragement, is in a fair way to become exceedingly wise. He never doubts that life is well worth living, and worthy of his best, strongest, and most enduring efforts. He says with the poet:

> "This world's no blot for us
> Nor blank. It means intensely and means good."

All his powers—physical, mental, and moral—are called into action as means to the accomplishment of his great ends.

He finds very soon that, while the end remains ever the same, conditions are ever shifting, and demanding new means or modes of meeting them. He skillfully adapts the new means to the old ends.

The pilot makes for the same harbor a hundred or more times. Harbor and channel, lighthouse and buoys, remain the same. But wind, tide, and current shift continually, and he must set sail and rudder accordingly. Now he comes in on a straight course with rapid progress. Again he has to beat against wind and tide; his progress is slow and his course tortuous. But

he is all the time making for the same point. Every turn of the helm and swing of the sails has its reason and proves his skill. Sometimes he creeps in the mist by dead reckoning, not having seen sun nor star for many a day. But through it all he keeps his sails set and his rudder true.

Only the motives which spring from these racial convictions are worthy of and adequate to the vast powers of the human mind. Roused by these and steadily held to his purpose, man becomes a being of Titanic power. He cannot flinch in the fight or weary in the race. He "fights a good fight and finishes the course."

Everyone of us has met some such men and women. They are stout-hearted, cheery, hopeful, wise, calm, patient, and heroic, with iron in their blood, granite in their souls, and sunshine on their faces. The old prophet had such in mind when he said:

"A man shall be as a hiding place from the wind and a covert from the tempest; as rivers of water in a dry place, as the shadow of a great rock in a weary land."

Such people are the "shadow of a great rock," and when we are weary, baffled, defeated, and

disheartened, when all day long we have been fighting in the mist, how good it is to rest in their shade! Their words may be few, their "speech rude, and their bodily presence contemptible." But we feel their strength. We lean against them for a little time, and we go away refreshed, strong, hopeful, courageous. Virtue has gone out of them and into us. This is no theory, but a statement of universal experience.

There is no contagium in the world like that of a strong personality. We would not resist it if we could. We would give anything to be infected. Everywhere such men and women carry strength and courage to others. One such man infects a whole community or race, molds a civilization, and changes the course of history. For this reason history is summed up in the lives of heroes.

If we have failed to realize this we may well read our history all over again from the story of Gideon and his three hundred to that of Socrates in Athens, of Napoleon at Lodi, and of Sheridan at Winchester. Such men are not merely beacon lights, they are makers of history.

The same principle applies in literature. At

the end of a hard day's work we drop in on neighbor Snagsby—provided that Mrs. S. is away from home—or make our very best bow to that gracious lady Miss Esther Summerson, or sit awhile with Colonel Newcome, or keep Twelfth Night with dear old Sir Toby, or wander far afield with some more respected Shakespearean character. After a time the irritations of the day are forgotten. A feeling steals over us, we know not whence, why, or how, that life is not half bad, and that it is worth while to be decent and even courteous.

The men and women who have this strength and carry this contagium may be rich or poor, learned or unlearned, intellectual or possessed mainly of what we call common sense. They are not limited to any walk of life. Great material prosperity does not generally breed a great crop of this kind of character. They have generally come out of much tribulation. You cannot raise heroes in bandboxes, or make a Damascus or a "true Jerusalem" blade without hammering. If we will but search for them, we can find them in all times and circumstances. If we do not find them, the fault is in us. Wherever they occur, they are always leaders, though

they may not suspect it. They are the real kings and queens. Their power for good is inestimable. The great advantage of social life, as a means of conformity to environment, is the medium which it furnishes to conduct the power of such men and women.

Man's last effort to conform, the struggle for existence in its highest and most real form, is the life and death grapple between good and evil. Here good and evil, right and wrong, truth and falsehood, come face to face. Life is more than a game of chess [1] or chance. It is a battle, in which every one must take part; he must fight or die.

The real kings are, as a rule, on the side of truth and aid its triumph. One essential of such leadership as we have been studying is the power to inspire confidence in the king. A suspicion of selfish aims in the leader breaks the bonds and rouses revolt. The hero must be self-forgetful. This is one reason for hero-worship and for the hero's magnetic power. But evil is essentially selfish, and can hold the throne only as long as it can deceive.

[1] Huxley, T. H., "Lay Sermons," p. 31.

These kings "live forever." Dynasties and empires disappear, but Socrates and Plato, Luther and Huss, Cromwell and Lincoln, rule an ever-widening empire of ever more loyal subjects. Society will have leaders. Men may set up whatever form of government they will, they are always searching for a king.

This is no sign of weakness or credulity. Man's desire for leadership is only another proof of the vast future which he knows is before him, and into which he desires to be led. The wiser a man is, the more he desires to be taught; the nobler he is, the more whole-souled is the homage which he pays to the noblest. Is it a sign of weakness or ignorance in students of adult age to flock to some great university to hear the wisdom and catch the inspiration of the master mind? When Jackson fell, Lee exclaimed, "I have lost my right arm." Was Jackson any the less for being the right arm to deal, as only he could, the crushing blows planned by the great strategist?

These men and women are the salt which keeps society sweet, and the leaven which raises it. They form a real though unrecognized hierarchy. Some stand in high positions, while

others do the same work in lower places and more limited spheres. England did not think or care much about Sergeant What-is-name, but the sergeant made history.

"Though he drilled a black man white, though he made a mummy fight,
He will still continue Sergeant What-is-name—
Private, Corporal, Color-Sergeant, and Instructor—
But the everlasting miracle's the same."[1]

This is the everlasting miracle of life worked unconsciously but continually by these loyal followers of the convictions founded on racial experience.

There can be no surer form of knowledge than that which has crystallized out of racial experience during past ages. But while rooted in the past, it looks largely toward the future for its triumphs and rewards. Faith in the future is no less sure or reasonable than our knowledge of many present things. But the present looms large before every eye. The future must be somewhat or considerably less distinct. "We

[1] Kipling, R., "Pharaoh and the Sergeant," *McClure's Magazine*, 1897, vol. ix, p. 925.

cannot see, much less feel quite assured of, the "upper side of the pattern." The future event and far-off goal remains visible only to him who fixes his attention and gazes upon it. It requires an effort to prevent ourselves from becoming nearsighted. There is in faith an element of will which is lacking in knowledge; it is the more virile virtue of the leader and pioneer. But we must carefully notice the place where the will comes in. Not in the glimpse of the far-off promise, nor in the persuasion of its reality and certainty. These rest on racial experience and are almost instinctive. But the will is needed to hold the attention and thought fixed upon that of which we have become persuaded until we can follow and realize it.

Knowledge is continually improving and increasing. Theories of to-day are swallowed up to-morrow in some broader generalization or law or wider or deeper view. Outgrown theories are as stale and unprofitable as superstitions. This must be true as knowledge broadens and deepens. But the far-off goal on which the eye of faith is fixed neither shifts nor changes. Every step toward it is a permanent gain, and need never be retraced. Every advance makes

the goal clearer, more distinct, and more attractive, and thus increases knowledge and strengthens faith. Neither knowledge nor faith can safely say to the other: "I have no need of thee." Each has its own place, and the two supplement each other. It must be so in any case involving progress into the future.

CHAPTER VIII

CONFORMITY TO ENVIRONMENT

THE most remarkable characteristic of the living substance is its adaptability. It does a great variety of work under the most varying conditions. The simplest one-celled plants and animals live in fresh water and salt, of all degrees of purity or foulness, of varying temperature, impregnated with different substances. The bacteria go almost everywhere.

Similarly the complex higher animal is continually becoming adapted to new conditions, and varies accordingly. No sooner does a form become well established than it begins to attempt, as it were, to adapt itself to live under all possible surroundings. The primitive reptile crept on the ground. Its descendants adapted themselves to live in marsh, jungle, upland, lake, river, and sea. Some flew in the air. They lived on very different kinds of food. This tendency toward

" adaptive radiation," [1] or divergence in all directions, mitigates the severity of competition within the species or group, opens new doors for survival, and gives the possibility of progress or degeneration. It enables the weaker form to discover a harbor of refuge and here survive, as it could nowhere else. Fresh water and the deep sea have always been the refuge of defeated forms.

This tendency has its dangerous side. The animal is continually tempted to forsake the upward line of march, and to seek some easier or more attractive path. Alluring side paths are very numerous and always open. Every new attainment of the animal gives it the opportunity for new experiments and adaptations. Every stage is a center from which forms radiate in all directions seeking surer survival or easier life.

But usually only one path, one set of habits, adaptation to only one group of surroundings, leads to progress and fitness. All others lead to stagnation or degeneration. Temporary sur-

[1] Osborn, H. F., "Adaptive Radiation," *Amer. Nat.*, vol. xxxvi, 1902, p. 353. See also articles in vols. xxxvii and xxxviii.

vival is after all comparatively easy, but progress is the difficult matter. Food is usually abundant, enemies can be avoided or foiled in many ways. Progress seems usually to have occurred only or mainly under the spur of necessity. The great danger seems to be that the animal will develop some structure which is temporarily advantageous, but which will in time make further progress impossible. We have seen that this was evidently the mistake of mollusks and insects, and at the same time of all forms which are represented by the side branches of our genealogical tree. All promised well at first. Many attained survival to a greater or less extent. But no one of these attained permanent progress. This was reserved for forms in the middle ascending stem of the tree, the line leading straight upward to man.

The great problem for animals and man seems to be not how to get a living, but how to live so as to insure advance; not so much to seek out new, easy, and promising radiating lines of livelihood as avoiding these to follow the one upward path. Even extinction is in many cases the result of so complete conformity to conditions which are transitory that, when these change, the

animal finds itself in time ill-adapted to the changed surroundings and disappears.

Thus even conformity to environment cannot guarantee permanent survival of a form, much less can it guarantee progress. The mollusk and many sadly degenerate parasitic forms are admirably conformed to their environment. Conformity to environment is one condition of survival and hence to the possibility of progress, but it can guarantee neither. The highest and most complex forms find exact and complete conformity far more difficult, more new possibilities open before them; hence they have suffered even wider extermination than the lower.

Evidently if clam, parasite, and man have all conformed to environment, if the most degenerate and the most progressive forms agree in this respect, then they must have conformed to very different environments by very different habits and modes of life. The environment to which we conform is just as important as our conformity to it.

How can we judge of anything so complex and ill-defined as environment except by noticing the result of conformity to it? Environment stands to the animal in a relation somewhat

similar to that of the seal to the wax. The impression on the wax is often far more legible than the monogram engraved on the seal. We may put this fact in another form. Environment is really a great host of forces and tendencies pressing and crowding, luring and drawing, the animal from all sides. But the animal cannot at any one time yield in all directions. All these forces unite in one grand resultant, urging the animal in a certain direction. Similarly gravitation, wind, tide, eddy, and current, all unite to drive a sailboat along a steady course.

When we study the impression which environment has made upon animals, or the resultant of its forces as shown by the directions in which they have been urged, we notice that the impression and resultant have continually changed as they advanced from stage to stage of development. During the zoöphytic stage the chief business of our ancestors was to develop good digestion, worms had to develop muscles, early vertebrates a backbone, mammals a brain. Judged by its impression or resultant, environment appears successively as a power making for good digestion, then for muscular power and quickness of movement, then for shrewdness.

Finally, as we have seen, in human history it unmasks itself and appears as a power making for righteousness and unselfishness.

All animals live in one world. But in a very true sense fish, barnacle, and protozoan, all living side by side in the water, still live in different worlds. Higher forms pry deeper and lift themselves higher and thus come into relation with elements which pass over the lower form without affecting it. The development of the visual eye, the passage from blindness to sight, revolutionized the animal kingdom. Directly or indirectly it brought the animal under a host of new conditions and emergencies. It changed the environment of the animal, and the seeing animal became a most important element in the environment of all his neighbors. The life of the animal kingdom is a series of experiments, and every experiment results in the discovery of something before unknown or unrecognized which now becomes a part of environment. Up to this time the unrecognized element may or may not have impressed itself upon the animal. The animal kingdom seems at first to drift like a raft on the current. Later it raises sail; it has given to an old force a new hold upon

itself. It adds a rudder or steering oar, and now every swing of the rudder changes the resultant of the forces of wind and tide.

It seems evident that all surviving animals conform to environment, and that those which conform to the highest or best environment progress. Conversely environment is that to which all living beings conform. It includes all those objects, forces, tendencies, which have any effect or bearing upon life. But any force which could not touch or in any way affect the life of an animal would form no part of its environment. Music could form no part of the environment of a totally deaf world of animals. Only in so far as an object directly or indirectly comes into the range of our experience and affects our life can it be said to really form any part of our environment.

Our surroundings include all the objects and forces of the universe; our environment, however broad, is limited. We cannot come into close relations with all objects and beings. With some our relation is very close, with others it is remote and slight. Some forces and objects move us powerfully, others very feebly or not at all. The former play an important part in

our environment, the latter a very subordinate one, if any. Captain Kidd's treasures lie buried beneath my doorstep. As long as I have no suspicion of their existence, they form a part of my surroundings only, not of my environment. I suspect their nearness and begin to search half-heartedly or earnestly. They modify my habits of life somewhat or considerably. They are a part of my environment. Some day I discover them. Overjoyed at my suddenly acquired and unearned wealth, I indulge in every form of luxury and dissipation. They have changed my whole life, and have become the dominating element in my environment. The same object at different times varies greatly in its importance in my environment, according to my own moods and its nearness or remoteness. We might perhaps say that its effect varies inversely as the square or some higher power of the distance.

Girl and boy have lived in the same town. They become acquainted, interested, attached, engaged. What new thing has caused a new heaven and earth to spring up around the newly engaged pair? Only a new relationship; this alone has changed. One new relation has transfigured their lives.

The content of the books may form an insignificant part of the environment of the page or other attendant in the library. Another man may have but few books and little time for these, and yet he may live in them. One man is lifted, thrilled, and strengthened by music, paintings, the beauty of smiling valleys, of cloud and sunsets, or the grandeur of the mountains; another is but little affected by any or all of these. They may form the surroundings of both; only he who can feel their beauty makes them a part of his environment.

Two men read a page of poetry or of science. One is inspired by that "splendor of truth" which was Plato's definition of beauty; the other is scarcely moved at all. The passage is really as foreign to him as if written in an unknown tongue. It is no part of his environment. No man can be a hero to his valet, if heroism is foreign to the valet's environment.

Hence from the same surroundings men may go "down to Gehenna or up to the throne," each going from his own environment to his own place. And from totally different surroundings similar characters may develop. Environment is evidently that part of our surroundings with

which we form some relationship, and the closeness of the relationship determines how large a part each object shall play in it. Surroundings are the material from which we select a very small part out of which to frame our environment. To this environment once chosen, framed, and accepted, we will surely conform. Surroundings therefore, as has been said, spell opportunity, but environment spells doom.

If this be true, it follows that improvement of surroundings is no guarantee of improved environment. Improved surroundings mean removal of obstacles to progress and greater opportunity. If the individual is already intent upon making the very best possible use of his surroundings, this is all that is necessary. If he does not care for better things or will make no resolute effort to attain them, if he is not making at least fair use of that which he has, farther opportunities will benefit him little.

All the treasures of art, science, and religion are wasted on the man who does not care to think about them, or who allows his mind to become so occupied with other things that he has no time to notice them. Wealth, learning, and mental discipline are all opportunities which

may be used for good or to pander to evil. Even the grandest moral and religious truths, carefully and thoroughly learned, may lie in the mind neglected and unheeded. They form no part of our environment until embraced and assimilated, just as food is of no use even in the stomach until it has been digested and absorbed. Indeed, too much of it may give rise to indigestion and dyspepsia. There are many dyspeptic souls, wealthy men who are not generous, learned men who are not wise, and moralists who are immoral.

Increased or better opportunities are good as far as they go. They do not reach the real seat of the difficulty. This lies in the will and purpose. To treat the intellect for weakness of the will is as wise as to prescribe external applications for a disease of the blood. It is treating the symptom instead of the disease.

This fact has been clearly recognized by all great thinkers. Plato said that many men must be improved before they could be educated. Another equally great thinker has said, "The law is weak." Even knowledge of law and vision of truth are not enough. It is not enough to see and be persuaded of the promise. It must

be embraced. Hence what is first needed, what is fundamental in all reform or education, is usually not more instruction in knowledge but more inspiration, not argument but uplift, not more information but a higher purpose and a stronger will set on right. Evolution leaves us still face to face with the old baffling problem, how to change and improve the will.

We noticed in our study of the evolution of the animal kingdom that at every stage a large part of the group refused to go farther, and either strayed from the upward path or stagnated and degenerated. This is what we might well expect. Nature surrounded the progressive form by stronger competitors which drove it into and along the right way. The primitive vertebrate was compelled to swim by mollusk and crab; the mammal was hunted into shrewdness and agility; the arboreal mammal was compelled to climb. The fittest arose not from choice so much as from compulsion.

Once and again in human history the same compulsion has been necessary and has proved effective. Our ancestors were nomads, perhaps, on the plains of Asia. They had to become agriculturalists, cultivators of the soil, if any

higher stage of civilization was to be attained. Wallace has well said that nomads become agriculturalists only when and as they are starved into tilling the soil. What arguments or eloquence will you use with the nomad to persuade him to make this change in life? He knows by long experience the pleasures of ease and freedom, he has seen the long hours of hard labor of the husbandman. The advantages and pleasures of a higher civilization appeal but feebly to him, he has never felt or experienced them. He feels no higher needs. His present situation is good enough.

The problem seems to have been solved in a very simple manner. Our ancestors migrated from the open steppe into forest-clad Europe. Pasturage became very scarce. Open land was limited. They must cultivate it or starve. Many starved. Some learned to till the soil. The spur of necessity is the best teacher.

This compulsory process is wasteful and expensive. It requires a very large body of unprogressive police to occupy and guard every side path, and thus compel a " remnant " to follow the right one. But in the case of man it is usually impracticable. For, when compelled to

live under the very best surroundings, and compulsion can go no farther, the man frames a good or bad environment, according to his character and choice.

To a certain extent, and far more than most of us suspect, we are still held to a certain standard of morality or decency by the pressure of the opinion of our friends and neighbors. Remove any man or body of men to a distant land; let them feel sure that their actions and modes of life will remain unknown at home; many will surely sink from the lack of the sustaining influence of home and friends. But this process can raise men only to its average standard; it can hardly insure progress. Something higher and stronger is needed.

The problem of human evolution is clear. We must persuade and inspire men and women to press on to the next higher plane of life; to yield, if necessary, a certain amount of present advantage for the sake of greater future benefits for themselves and far more for their children; to repay to future generations the debt of honor imposed upon us by the benefits which we have reaped from the labors of our ancestors. The ascent must be made by the steady and habitual

exercise of our highest powers. The moral and religious life must form a larger part of our thought and interest as well as of our life. They must be made a business. For as a man thinketh in his heart, and on the plane of what most occupies his thought, so he is.

The attainment of a higher plane through the exercise of higher powers demands a change of habits of thought as well as action. Such changes of habit are never easy, they are more difficult every year of life, as old lines of thought and action become more fixed and easy; in time change becomes practically impossible. Moreover, the arguments and inducements to remain on the lower plane are many and plausible. Inertia and present habit are sufficient to fetter many. The present holds them by custom and by hereditary tenure. Present advantages are numerous and clear. They are close to us in our surroundings, and crowd naturally and easily into the first place in our environment. Provision for present material needs and against similar future dangers and emergencies is a daily duty. It easily becomes the chief end and effort of life, and absorbs all our thought and energy.

The present and tangible are very real to us. The enjoyments which they offer have been tested and found excellent again and again in past experience. Imagination continually represents them before us. Over against these the advantages of future attainments of untried powers seem dim and unreal. They cannot be appreciated until the experiment of exercising them has been thoroughly tried. The first attempts made in the face of old habits and at the loss of present ease and comfort, are likely to produce friction, discomfort, and vexation. Then life is an experiment and the future is always uncertain. The goal is far off and unattainable. Our highest possibilities can be realized to only a small extent. May we not hope that, after all, evolution will bring survival and progress to all alike, fit and unfit, without our effort? Is it worth while to struggle? Many very "practical" people say, "Decidedly it is not worth while."

"We have had enough of action and of motion we.

"Let us swear an oath, and keep it with an equal mind
In the hollow Lotos-land to live and lie reclined
On the hills like Gods together, careless of mankind.

Surely, surely, slumber is more sweet than toil, the shore
Than labor in the deep mid-ocean, wind and wave, and oar,
Oh, rest ye, brother mariners, we will not wander more."

Moreover, the mere wish to attain, the dream of it, the thought that we will some day arouse ourselves, are all alike useless and dangerous. Even half-hearted efforts are not enough. Says Carlyle of Burns:

"It was clear to Burns that he had talent enough to make a fortune, could he but rightly have willed this; it was clear also that he willed something far different, and therefore could not make one. Unhappy it was that he had not the power to choose the one and reject the other, but must halt forever between two opinions, two objects; making hampered advancement toward either. But it is so with many men; we 'long for the merchandise, yet would fain keep the price'—and so stand chaffering with fate, in vexatious altercation, till the night come and our fair is over!"

But Locke, Milton, and others had "two things which Burns wanted, both which, it seems to us, are indispensable for such men. They had a true religious principle of morals, and a single, not a double, aim in their activity. . . .

They willed one thing to which all other things were subordinated and made subservient, and therefore they accomplished it. The wedge will rend rocks, but its edge must be sharp and single; if it be double, the wedge is bruised in pieces, and will rend nothing."

This is so clearly a truism of success everywhere in life that it needs no further proof or illustration. Yet it should be emphasized especially of the rule of right and duty in the heart. For these will accept no divided allegiance. If they cannot rule supreme they abdicate and forsake their former kingdom and home.

To persuade men to such loyalty, and thus to hold them to the only path of permanent progress, is no easy matter. The individual must establish the closest relation, and conform to and live amid, these invisible and intangible realities. Motives must be presented which will appeal to the cool judgment of the intellect, but which will go far deeper. Through the intellectual interest they must reach the heart and arouse the glow of feeling, which alone can stimulate the will, and thus permeate and mold the whole being and life. Only thus can conformity be assured.

We are too much afraid of the feelings and of any appeal to them. Yet our feelings are in general as correct as our opinions. President Hall has well said that opinion is individual but feeling is racial, something larger and deeper than opinion. "Out of the heart are the issues of life." When Bunyan will find a hero strong and brave enough to kill Giant Despair, he sends out Greatheart. Swelled head would make but a poor showing in that battle.

A deep thinker has well said: "If we are wise we shall never ignore the great fact that men are not lifted from a lower to a higher plane of life through processes of the understanding, or through any enlightenment or enlargement of the intellectual powers. Men are not perhaps in anything, certainly in the comprehensive conduct of their life, governed by their understandings. I do not now try to explain the fact; I only state it as within the sight of all. The controlling motives in human conduct do not spring from the intellectual side of human nature. We do not love as a process of inference, nor hate as a logical deduction. That which is all clear to the intellect may be anything but cogent to the heart and to the will.

"The only motive which can move a will is either a will itself or something into which a will enters. It is not a thought but only a sentiment, a deed, or a person by which we become truly inspired. It is not the intellect, but the heart and the will, through which and by which we are controlled. It is not the precepts of life, but life itself, by which alone we are begotten and born unto life." [1]

Wisdom comes from the vision and study of great thoughts; life is kindled by the vision and thought of great lives and great deeds. "Where there is no vision the people perish."

Our study of environment has led us to the same conclusion as our study of racial experience. The leavening power in the world, that which draws to the selection and framing of the best environment, out of whatsoever surroundings, is the dynamic compelling power of a great life based on moral and religious convictions.

We have found this to be the central thought of history, a heroic soul infecting a community, race, or nation. It is the central thought of all

[1] Seelye, J. H., "Christian Missions," p. 144.

effectual education, the young and impressible exposed and brought close to the contagium of a powerful life, not to a mere walking encyclopedia of learning. It is the central thought of Christianity, no mere doctrine, creed, or law, but a grand life so perfectly conformed to the unchangeable and eternal that all the power of the universe is on its side.

Is it the central thought of evolution in a grander and deeper sense than we have ventured to suggest? On the vaulted ceiling of the Sistine Chapel in Rome, Michael Angelo painted his vision of the creation of man. A magnificent half-recumbent human figure is rising as if just awakened from sleep or unconsciousness, and is stretching out its hand to reach the hand of God held out to meet it. It is a strange conception of creation, but, if you wish to call it a picture of human evolution—God reaching down and life struggling up until the two can clasp hands—many facts of science would find their most adequate ultimate explanation in such a view.

CHAPTER IX

SOCIAL ENVIRONMENT

WE have completed our hasty sketch of human evolution. We have traced its course and briefly analyzed the chief factors and processes involved in the long and slow upward progress. But our aim has been practical rather than academic. We have studied evolution mainly in order to discover what light it can throw on present problems. It seems necessary, therefore, before we close, to attempt to apply the results of our theory to present conditions and needs.

This venture involves much repetition as well as risk. Every upward step has been of the nature of an experiment, whose results could not be foretold. Every modification of habit, structure, or institution demands that we retain all that we can of the good in the old with as much added progress as is possible or safe. Progress has been by steps, not by leaps or bounds.

All our present institutions are a mixture of old and new. We must not sacrifice the good that was in the old, neither must we allow it to hamper the development of the germ of something better involved in it. Racial and social experiments are necessarily compromises; time must test their wisdom and value.

Conservative and radical students of present conditions arrive at very different conclusions. The laws of biological history may be clear, but their application to individual cases is very difficult. Even the charge to the jury is tinged by the constitution of the judge. Our practical application must be a mixture of more or less safe scientific inferences with personal opinion or prejudice.

Stick as close to fact and truth as we can, error will slip in. There will be much room for difference of opinion. The reader must use freely his own critical judgment. The value of our conclusions must be largely in their suggestiveness. If they can lead the reader to adopt the standpoint of the evolutionist as the best from which to judge and estimate present social experiments, they will have served a useful purpose. If we can gain a surer confidence in some

ancient, and now somewhat unfashionable, means and institutions, it may do no harm. If at the end we have discovered nothing startling or new, our search may not have been fruitless. For truism is often only another name for important truth which we may have always known, but which we have neglected or forgotten, and of which we need to be reminded.

The goal of human evolution seems to be a race of vigorous, healthy, whole, well-balanced men and women. Such men and women will be healthy physically with well-grown and fully developed strong and tough bodies. Good digestion will furnish abundant material for growth and repair and fuel for the use of our muscular and nervous systems. Clean and pure, well-oxygenated blood driven by a stout heart will stimulate instead of clogging the action of every organ. Tough muscles, adequately exercised, will insure health, power, and efficiency. A calm, steady, nervous system will give economy of effort, grace and efficiency, and strength of action. Physical vigor will be accompanied by many most important virtues—hopefulness, cheerfulness, courage, confidence, endurance, steadfastness, and many others.

The intellect will perceive clearly the real ends of life, will furnish the vision of ideals worthy of complete devotion, and will discern means adequate to the attainment of high ends. This clearer vision will stir deep feeling and emotion. Feeling and devotion will stimulate an iron will set on the reign of truth and right.

The lives of these people will be completely dominated by convictions of right and duty born of ages of racial experience. They will be large, deep, beneficent, like "rivers of water" or the "shadow of a great rock," as we have already seen.

Such men and women, and only such, will be conformed to all that is great and worthy in their surroundings, to the unseen and eternal, to all that is divine in this grand world, and will thus have been "transformed by the renewing of their minds." They will have clasped hands and joined purpose and will with the God in whom the religious experiments and experiences of ages have compelled or drawn them to believe. They will cast in their efforts with the tide of events sweeping on to something still higher and better. They will progress faster

than we, their success will be sure. Evolution gathers momentum in its course.

We have found that man's share and work in the process of evolution is the higher development and complete supremacy of the moral and religious powers, just as it was the business of the worm to develop viscera, and of the lower vertebrates to add new muscles and motor nerve centers. Wealth, learning, and civilization are important chiefly as they contribute to this end. Failure to make the highest supreme is degeneration and means extinction.

But as we look out on this whirl of social life we are puzzled and become confused. It is too near us to allow of any perspective in our view or picture. We wonder whither it is moving, or whether it has any meaning or goal. We are confident that there is progress as well as degeneration. But whether the progress is in America or China we are not quite sure. Society is not the same in any two states, cities, or towns. Indeed, every individual may be said to have his own society or social circle, apparently independent of his state or clime and of the government or social usages under which he lives.

Society tends to become more complex and

varied, and hence more difficult to analyze or understand. The "primitive simplicity" is gone. In races living in savagery or barbarism all the members seem to be much alike in work and pursuit, in aim and purpose, in material and mental possessions. All is monotonous. This may or may not be quite true. But in our social life to-day there are vast differences in material, physical, moral, and religious endowments; in handicraft, trade, profession; in station and rank; in wealth, learning, and power.

These great inequalities seize our attention and occupy our minds. Thoughtful writers emphasize their unfairness or injustice, and plead eloquently for equality of opportunity at least. They compare the poverty and straitened life of great masses with the wealth and luxury of the few. But doctors of sociology still disagree as to whether accumulation of great wealth by a few individuals is harmful or beneficent to society. We all recognize that anything like equality of wealth must be the attainment of a far distant future. Most of us readily recognize that society will not be greatly improved by those who wait for perfect conditions to aid them to make perfect men. Some have already

discovered that "a man's life consisteth not in the abundance of the things which he possesseth." Perhaps, if every one of us would recognize his responsibility for other possessions beside wealth, and his duty to give freely of the best which he has abundantly of any kind—whether money, learning, wisdom, courage, hope, health, cheer, and comfort of any sort — the inequality might be made a very real and positive rather than a very doubtful blessing.

Here, as in the last chapter, we have to draw a very sharp distinction between social surroundings and social environment. If we can discover the nature and elements of a man's social environment, we know whither he is tending and what he will become, for it determines his character and doom. It is of far greater immediate importance than physical environment, for it molds directly his moral and religious development. But some or many institutions and tendencies affect us indirectly and slightly; they are hardly more than surroundings which spell opportunity to be used or neglected as we will. A man may be the slave of democracy, free under tyranny, poor but making many rich, a boor in

broadcloth, or a nobleman in homespun. Here especially environment is almost altogether a matter of relations, the product of choice and selection. When a man chooses or accepts his friends or heroes, he is framing the largest part of his social environment, whatever be his state or city, the form of government under which he lives, or the rank or station which he adorns or disgraces. Improvement in these latter respects may increase opportunity or remove hindrances or obstacles. But the character of his environment, we repeat, depends ultimately on the choice or selection of the individual.

We are led to consider society as a bundle of possibilities of good and evil, of which one will realize the best, another the worst. It is like a mass of the most varied building materials—one builds a royal palace, another a hovel and lives squalid and vulgar all his days.

Yet here again as elsewhere some of our surroundings press closely upon us. It is almost impossible to prevent them from becoming a large part of our environment, especially during our earlier years when we are most easily impressed. Others invite and allure us repeatedly

and importunately. We need only accept them and allow them to make or mar us. Other elements remain always remote.

It seems, therefore, the wisest course to seek in man's constitution and surroundings those elements, objects, tendencies, or institutions which lie very close to him, and which, wisely and adequately used, will most surely urge or allure him to frame the best social environment from material which is everywhere freely at his disposal. But if we are to rely on these for the improvement or regeneration of a race or community, they must be already to some extent in our possession; we cannot wait for ideal means or for the conditions of a remote future. They must have been tried and found useful through centuries or millennia of racial experience, and thus guarantee a fair prospect of success. They must be adequate to man's highest needs and work, to the furtherance of his moral and religious development, his chief duty and glory.

First among the means or incentives of progress are man's inheritances from a long series of progressive, aspiring ancestors. Our young men and maidens see visions, perhaps dim and

indistinct, strange mixtures of the real and possible and the impossible, of the priceless and the worthless, but of marvelous power and efficiency. Says Stevenson of man: "Poor soul, here for so little, cast among so many hardships, filled with desires so incommensurate and so inconsistent, savagely surrounded, savagely descended, irremediably condemned to prey upon his fellow lives; who should have blamed him had he been of a piece with his destiny? To touch the heart of his mystery, we find in him one thought strange to the point of lunacy; the thought of duty; the thought of something owing to himself, to his neighbor, to his God; an ideal of decency to which he would rise, if it were possible; a limit of shame, below which if it be possible, he will not stoop.[1]

We may clarify the vision, oftentimes we can raise the ideal. But some ideal, and the highest possible, must remain implanted in the mind. "Where there is no vision the people perish." This vision and ideal seems hardly other than a composite of the inherited racial convictions so omnipresent, so imperious, which strengthen

[1] Cf. Stevenson, R. L., "Pulvis et umbra."

as life goes on, unless smothered and forgotten through our neglect.

Over against this priceless inheritance, for every one of us is born to a kingdom, stands education in the broadest sense of the word, including all means of stimulating growth and development. Nature is the great educator, and framed her bill of compulsory education long before man arrived on the globe. Life and experience are the great teachers, and the world is the school of this grand system from which we are never graduated. School and college are only human devices, artificial institutions, to make good the deficiencies of, and to prepare the child and youth for, this grander training. Says Professor Huxley: "That man, I think, has had a liberal education who has been so trained in youth that his body is the willing servant of his will, and does with ease and pleasure all the work that, as a mechanism, it is capable of; whose intellect is a clear, cold, logic engine, with all its parts of equal strength and in smooth working order, ready, like a steam engine, to be turned to any kind of work, and spin the gossamers as well as forge the anchors of the mind; whose mind is stored with a knowledge

of the great and fundamental truths of Nature and of the laws of her operations; one who, no stunted ascetic, is full of life and fire, but whose passions are trained to come to heel by a vigorous will, the servant of a tender conscience; who has learned to love all beauty, whether of Nature or of art, to hate all vileness, and to respect others as himself. Such a man, and no other, I conceive, has had a liberal education, for he is as completely as a man can be in harmony with Nature." Every reader will remember this "Address on Education" in which Professor Huxley compares life to a game of chess, and defines education as learning the laws and moves of the game.[1]

In this grand system of education the home plays a leading part. We hear that the family is disintegrating through frequent divorces, and that home training is poor and inadequate compared with that of a century ago. We freely admit that divorce is far too common, and that most fathers and some mothers are too much occupied with the business of winning wealth

[1] See Huxley, T. H., "Lay Sermons, Addresses, and Reviews," New York, 1871.

and fame or social distinction to pay much attention to anything so unimportant as the needs and possibilities of their children. The children in the large families of our ancestors educated one another to an extent which we can hardly appreciate. The only child is a "vanity and vexation of spirit." But the evolutionist can comfort himself with the thought that the divorced pair and the only child are necessary incidents in the beneficent process of natural selection. Such abortive families leave few descendants to cumber the ground. These exceptions only prove the rule that the great mass of the people live healthily in happy homes, where sturdy morality and mutual helpfulness prevail, and where children grow up in an atmosphere of love, kindliness, and mutual forbearance, if not of courtesy. The power of early environment, of a mother's love, cheerfulness, courtesy, calmness, courage, hopefulness, and other virtues, cannot be overestimated. It is second only to heredity, with which we sometimes confuse it.

The third great power for progress is the school. This is a comparatively new institution. It always faces shifting conditions and new problems as new needs arise and as family training

proves more or less adequate. Here we have still much to learn. We seem sometimes to have forgotten that the aim of school and college is not primarily learning, but the development of strong, efficient, well-balanced men and women, who can bear the burdens and do the work of their own place in life, and meet the emergencies of a complex civilization.

The chief business of the lower grades is, or should be, to promote healthy physical growth. The body of the young boy and girl demands more care and attention than the mind. Pulmonary, rather than cerebral, capacity is the best promise of future usefulness. Playground, garden, and gymnasium can help more than desk and recitation. Both are needed, but the physical is first, afterwards that which is mental and spiritual.

Our high schools are fast becoming people's colleges where all are introduced to the best and most inspiring in art, literature, science, in morals and religion. Skill in handicraft is receiving some of the honor and attention due to it. Schools and colleges are fast escaping from the thralldom of a mere academic learning, whose value was usually proportional to its remoteness

from human interests, occupations, and life. We are learning that courses of study and text-books are of less importance than the standpoint and personality of the teacher. Mathematics can be made to teem with vitality; biology is the science of life or of death; the " winged words " of Plato and Æschylus may be used as sources of inspiration or as subjects for textual criticism or archæological exhumations. In my childhood Milton's " Paradise Lost " seemed to be valued chiefly as a text-book for parsing and analysis.

In the end, that school or college is best fulfilling its purpose which best maintains and develops the physical, mental, moral, and religious health and vigor of its members, which cultivates the highest ideal, deepens feeling, strengthens will and purpose, and inspires to the fullest and highest life. The use of education as a means of racial progress is better understood to-day than ever before.

The press is far younger than even the school. Our taste for literature is still unformed and undeveloped, often decidedly perverted. The best and most life-giving books often form no real part of our environment. They do not furnish

sufficient relaxation and amusement. Plato and Shakespeare demand that we take them seriously. They refuse to play the part of the clown in the circus. We do not quite understand Shakespeare's fools, but have a dim suspicion that they are laughing at us. The best books from the evolutionist's standpoint are not necessarily those of most elegant diction or startling phrases. They are not necessarily the most exhausting or complete catalogue of scientific facts or the finest dissections of normal or diseased personality. They are true to life, as we say. They teem with the highest vitality. Their characters remain with us as friends and close companions and infect us with strength and courage. They not merely amuse or instruct, they build up and vivify.

Judged from this standpoint, no volume or library has such value as the Bible. Only a book of extraordinary vitality could have occasioned or survived the misunderstandings, misuse, and abuse of friends and foes which this book has suffered. It is a record or picture of the experience, feelings, and life of strong men and women facing and overcoming doubt and fear, hardship and pain, temptation and trial,

as we must do to-day. It teems with life and vigor, courage, hope and faith, from cover to cover. It is written, sometimes in tears and blood, by an "apostolic succession of great souls," who saw things as they were and are and must be. It is militant and triumphant, yet with the peace and calm of an incoming tide. No wonder that that stout agnostic, Professor Huxley, pleaded for its use as an instrument of popular education, and believed that "the human race is not yet, possibly may never be, in a position to dispense with it." [1]

Just at present we are so busy discussing questions of text and authorship, dates and historical setting, inerrancy and fallibility, and I know not what other important questions—and they are of vast importance—that we can give little heed or thought to the vital content. But this stage, I believe, will prove to be a "temporarily useful eccentricity rather than a definitively triumphant position," to borrow a phrase from Professor James. Sensible common people and minds not debauched by learning, ignorance, or conceit,

[1] See Huxley, T. H., "Some Controverted Questions," New York, 1873, pp. 38, 40, 72.

will not long be content to neglect this masterpiece of literature.

The unique value of the Bible is that, while its scope is exceedingly broad and covers all departments of life, its chief subject is moral and religious evolution, the pivotal or strategic center of human progress. It is a text-book of the highest biology, a record of actual experiments and experiences of men who were by nature and training experts and geniuses in this line. Hence ignorance of this classic is even more culpable than would be the confession of an evolutionist that he never found time or bothered himself to read Darwin's "Origin of Species."

But if man's rôle and business in the drama of evolution is and must be moral and religious development and progress, it is evident that there must be some institution which shall make this progress its chief aim and purpose. This is evidently the place of the Church viewed from the evolutionist's standpoint. Such an institution is all the more necessary in human education because men and women leave school and college just as they are entering the most trying and critical years of life. These institutions, as we have seen, accompany us as far as the

Interpreter's House. The Church should be the Greatheart to guide us on our lonely journey through the Valley of Humiliation and up to the clear vision of the Delectable Mountains, that heart and faith fail not along the weary road.

This is the chief end and purpose which must always dominate and permeate the Church's thought, work, and life. This does not mean that the institutional Church is necessarily an eccentricity. The Church may and must take up any line of work needed for human progress and welfare until some special institution can make a study of the need and satisfy it in the best and most adequate way. In many of our villages and smaller towns the Church is and should be the center of civic and social as well as of religious life. But when apostles leave the word and message of God to serve tables, there seems to be a misdirection of energy.

The Church is the army of Jehovah, Lord of Hosts, a disciplined army of hardy, heroic souls, each soldier aiding his fellow. Its orders are always "Forwards!" A purely defensive campaign is a lost campaign. It joins battle fiercely and fearlessly with every form of sin and misery, without counting odds or cost. Respon-

sibility, duty, not privilege, is the foundation stone of its character. It appeals not to the sluggard or weakling, but to the heroic and stout-hearted. Its motto is: "Be strong and of a very good courage." Its members touch shoulders and keep step with the great and good, the true and faithful, of all ages.

> "Part of the host has crossed the flood
> And part is crossing now."

But it is all one army inspired by grand traditions and fired by a still grander hope.

Several very interesting studies have lately been made of the psychology of the crowd and the behavior of mobs. They emphasize the fact that the crowd is likely to be swayed by feeling or swept by primitive instincts. While here and there the possible benefits of such feeling and action are acknowledged, they are rarely emphasized. The crowd is usually condemned as the enemy of cool judgment. Now cool judgment is invaluable and should reign supreme and alone in the laboratory, study, or council. But when the time for action has arrived, feeling has its place and is also essential. No one condemns the feeling which comes from touching

elbows and bursts out in a cheer along the line of battle. We hold mass meetings to stir patriotic feeling. Some learned and thoughtful men seem to have forgotten that cool judgment is not the whole of life or the intellect the only faculty. That "blind giant," the will, must also be counted. Action is at least of equal importance with thought. If we do not feel or care, we certainly will not act vigorously.

Some of us, too, in our zeal for progress seem to have forgotten that all our heritage from the past is not bad. This is a sad rehabilitation of the theory of total depravity. The primitive may still be good in essence. Even our benighted ancestors, upon whom we look down with such royal conceit, discovered some things worth remembering, and often lived very vigorous and worthy lives.

In patriotism, religion, and philanthropy, intellectual perception alone is not enough. Feeling and will are essential for life and action. Otherwise a militant and triumphant faith, in the best sense of the word, degenerates into a dead system of philosophy, which merely cumbers the ground and exhales germs of senile paralysis. When we have attained a reasonable

ground of confidence in our conclusions a stir of feeling or tingling of the blood is normal and not to be deprecated. It opens new reservoirs of energy, increases our endurance, and stirs all our powers. This is only one of many arguments for social worship stirring feeling, vivifying ideals, reviving half-forgotten convictions, and rousing every power to fruitful action.

Patriotism, philanthropy, and religion, service of country, man, and God, draw man's thoughts to the high, distant, and grand aims worthy of his powers. They lift him above the thought of self and the petty interests of the hour. They are distinctively human exercises and activities. They alone can call out his vast stores of energy and make him the Titan he can and should be. Without them he degenerates.

These are but a few of the means and forces which make for progress. As we hastily review them, we cannot but feel encouragement and hope and a deeper sense of responsibility. The possibilities within reach are indefinitely greater than our attainments. They gather power through generations, and were never so great as now.

Material wealth has never increased so rapidly as during the preceding fifty years. Yet we

hear of business panics arising from lack of confidence. There is no real lack of money, but it is all hoarded, locked up by timid men in safety-deposit vaults. Hence business suffers depression. Morally and religiously we seem to be in such a period of panic or depression caused by uncertainty and lack of confidence. We hesitate and "let I dare not wait upon I would." A timidity amounting often to cowardice cramps and fetters us. We are afraid of we know not what. Each holds back instead of encouraging his neighbor. "*Volo, non possum*" is not the motto and watchword of progress. Some day we will regain confidence, laugh at our fears, be ashamed of our former timidity and hesitation, and resolutely push forward.

Our sketch of evolution has brought to light no new means of progress, no radical cure-all for human weakness and troubles. We rely mainly on old institutions and tendencies. The new is always contained in the old, or is the old transformed and glorified. The Gospel fulfills instead of abrogating the law. Those who loudly proclaim that the institutions which have served man in the past and which have largely made him what he is are now antiquated and

worthless and should be swept away to give place to something entirely new, have forgotten the power of the generalized and primitive. They would "throw away the baby with the bath water," to borrow a very homely German adage. Evolution is sometimes radical, but underneath all it is always conservative as well. The good of the past thoroughly tested by long experience must be preserved, but it must be modified continually to meet changing conditions. Any great institution is like an army which must continually adapt its tactics, arms, and organization to new modes of warfare, and continually change front for attack or defense. Fulfillment not destruction is the watchword of the wise leader.

The evolutionist has a useful standpoint from which to observe and judge human society and institutions. That social order is the best which "fits as many as possible to survive." Any institution is valuable just in proportion to its fitness and adequacy to enlarge and deepen man's life, and to increase his strength, vigor, power, courage, and efficiency. The fitness and adequacy are tested by actual experiment. We have a firm ground of confidence in the old, while we feel our way toward the new and still better.

But, unless our study has been fatally wrong and defective, it is evident that the social environment of every individual contains just as many of these means and elements of progress as he accepts and adopts, and to the extent to which he makes use of them. No government or institution can frame an environment and force it upon the individual. Hence the greatest movements have generally started and gathered power in small circles. The hope of Israel lay, not in the army of Saul, but with David and his companions in the Cave of Adullam. The voice which was to move the world came, as Dr. Martineau has said, from an upper chamber in Jerusalem. When Athenian schools of philosophy had sunk in senility, a Jew was writing letters to a few common people of Corinth and Ephesus which were to be read through millennia. A carpenter, working through a dozen fishermen, conquered Rome and revolutionized the world.

We might venture to call it a law of history that the improvement of environment or surroundings starts with a life. This life spreads by contagion from man to man, and thus society is leavened. Hence we return to our starting point that we frame our best environment by liv-

ing with the best men and women of our own time and other times by actual association and by the study of history and fiction, and by resolutely and continually drawing from our associates the best there is in them, and contributing only the best in us. By this habit we also effectually aid others to improve their environment.

There is much truth in the "strong man" theory of history. But the greatest and wisest cannot make history if their people are immune to the contagion of their life and power. Socrates kindled Plato and Aristotle, and through them enlightened Europe. But neither Socrates nor Paul could raise and revive degenerate Athens. We need and have great leaders, but a host of Sergeant Whatisnames is equally necessary to pass on the contagion.

Hence, in last analysis, if society is not what it should be, the fault lies ultimately, not with government, institutions, or conditions, but with you and me. We can make a social circle of our own as and what we will. And the best social conditions and institutions will be barren and temporary if we do not cheerfully accept and vigorously promote them.

APPENDIX

CHART I shows the great divisions of the animal kingdom into subkingdoms or phyla, and their subdivisions into classes. These are here presented in artificial tabular arrangement. After each class stands the name of one of its most common or familiar representatives.

The classification of vertebrates might well have been carried farther. The subdivisions of the fishes which interest us are the orders of sharks and ganoids. The latter order is illustrated by the sturgeons and gar pikes. The only amphibia which concern us are the very oldest, the extinct Stegocephala. The ancient and extinct theromorphous reptiles were probably the ancestors of mammals. Among mammals the duckbill and Echidna are the last surviving egg-laying forms. The marsupials are represented by the kangaroo and other Australian forms. Above these stand the placental mammals, in which the embryo is nourished by the placenta, which absorbs nutriment and oxygen from the

wall of the uterus of the mother. Of this subclass, Placentalia, several orders interest us: 1. Cetacea (whales) very early assumed an aquatic life. 2. Rodents are represented by rabbits, squirrels, woodchucks, rats, and mice. 3. Ungulates include horses, cows, sheep, deer, elephants, rhinoceros, and others, a very large and flourishing order. 4. Carnivora. Examples: dogs, wolves, foxes, cats, weasels, bears, and hyenas. 5. Lemurs, now found mostly in Madagascar, were the ancestors of the next order. 6. Primates include monkeys and apes. At the head of the latter stand the so-called anthropoid apes, the gibbons, orang, chimpanzee, and gorilla. Probably no one of these recent forms represents the ancestor of man.

Chart II shows the great groups of the animal kingdom arranged in the form of a genealogical tree.

Chart III shows more fully the genealogical tree of vertebrates. Pithecanthropus is the form between apes and man discovered by DuBois in Java. For further account of this remarkable form see *Nature*, vol. li, 1895, p. 291; vol. liii, pp. 116, 296; *Amer. Journ. Sci.*, vol. lxix, 1895, p. 144. For similar and better charts see Cope,

"Primary Factors of Evolution," chap. ii, pp. 74–171.

Chart IV shows the succession in geological appearance of the principal forms of animals. The time of first appearance is marked by a cross opposite the geological period and under the name of the group of animals. Our knowledge of the first geological appearance of the different orders of placental mammals is very defective. All the principal orders are represented in the Eocene period, and must have originated earlier, as remains of mammals have been found in triassic rocks. The primitive amphibia were the Stegocephala. The earliest reptiles were probably much like the recent Hatteria. The Theromorpha were probably the ancestors of mammals. Archæopteryx was the earliest bird, with teeth and long tail.[1]

Chart V aims to show the successive origin of organs.[1] Their period of most rapid development is marked by a double cross. A single cross marks slower improvement. — means a decline in relative importance owing to the rise

[1] Compare Jordan and Kellogg: "Evolution of Animal Life," p. 297; Metcalf, "Organic Evolution," p. 105.

of some other organ. The period or place of the first appearance of an organ can be determined fairly accurately. Concerning its period of most rapid development there is room for much difference of opinion. Here the chart loses in accuracy what it gains in definiteness. Only substantial and general correctness can be claimed for Charts V and VI.

Chart VI is largely physiological, showing the rise of functions to dominance or supremacy in the animal body.

Chart VII accompanies Chapter V. It shows the principal competitors at each period of geological history, and their descent from the apparently defeated form of the preceding period.

CHART I.

The Animal Kingdom and Its Largest Subdivisions.

The Animal Kingdom.

Subkingdoms or Phyla.	Prominent Characters.	Classes.	Example.
I. Protozoa.	One Cell. No tissues.	Rhizopoda. Infusoria.	Amœba. Paramœcium.
II. Sponges.	Pores. Framework of spicules or horn-fibers.		Bathing Sponge.
III. Cœlenterata.	Radiate. Primitive stomach or Archenteron.	Hydrozoa. Actinozoa. Scyphozoa.	Hydra. Sea-anemone. Jellyfish.
IV. Worms.	Muscular body wall. No skeleton (?) or jointed appendages.		Earthworm.
V. Echinoderms.	Apparently radiate. Hard spinous covering		Starfish. Sea urchin.
VI. Arthropoda.	External locomotive skeleton. Legs.	Crustacea. Arachnoidea. Myriapoda. Hexapoda.	Crabs. Spiders. Thousand-legs Insects.

CHART I—(*Continued*)

	Subkingdoms or Phyla.	Prominent Characters.	Classes.	Example.
The Animal Kingdom.	VII. Mollusca.	External, protective shell.	Acephala.	Clams.
			Gasteropoda.	Snails.
			Cephalopoda.	Squids.
	VIII. Vertebrata.	Backbone.	Fish.	Shark.
				Sturgeon.
				Perch and Cod.
			Amphibians.	Newt.
				Salamander.
				Frog.
			Reptiles.	Lizards.
				Snakes.
				Turtles.
			Birds.	Crow. Hawk.
				Duck-bill.
				Kangaroo.
			Mammals.	Rabbit.
				Dog and Cat.
				Deer. Horse.
				Ape.
				Man.

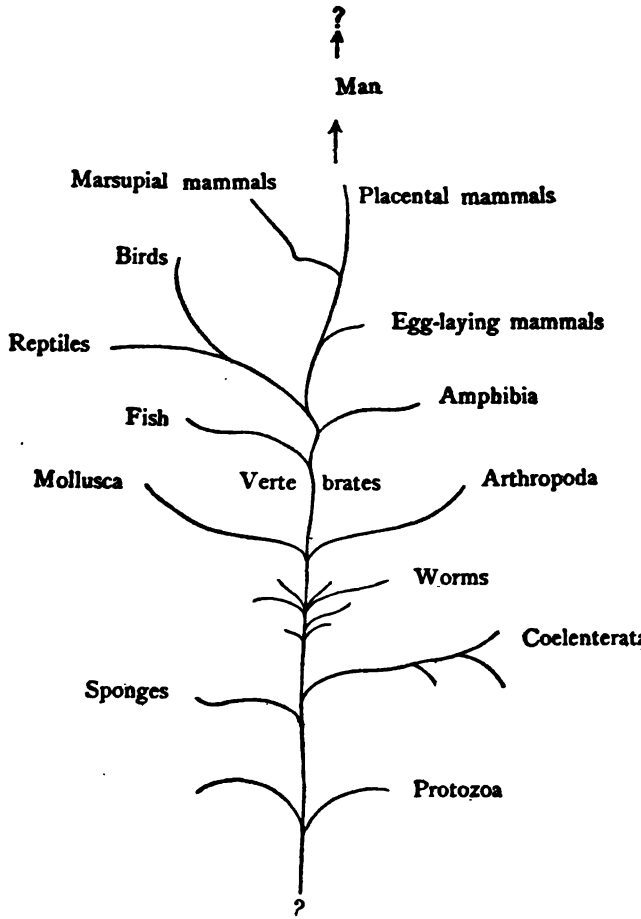

Chart II. Genealogical Tree of the Animal Kingdom.

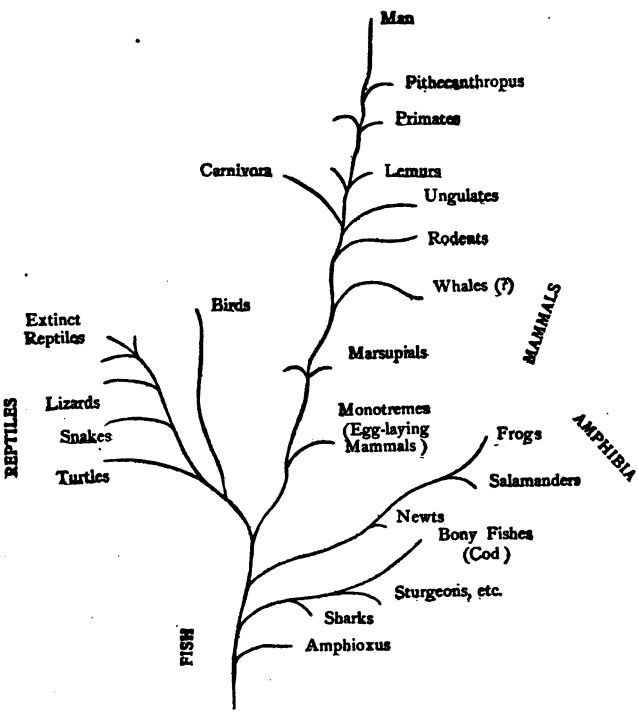

Chart III. Genealogical Tree of Vertebrates.

CHART IV—Geological Succession

Times.	Periods.	Worms.	Sharks.	Ganoids.	Bony Fish.	Prim. Amphib.	Frogs.	Prim. Rept.	Theromorpha.	Turtles.	Snakes.	Archæopteryx.	Toothed Birds.	Recent Birds.	Multituberc.	Rodents.	Carnivora.	Ungulata.	Primates.	Man.
Cenozoic.	Recent.																			
	Pleistocene and Pliocene.																			+
	Miocene.																			
	Oligocene.																			
	Eocene.						+							+ ?		+	+	+	+	
Mesozoic.	Cretaceous.										+		+	+ ?		?	?	?	?	
	Jurassic.											+				?	?	?	?	
	Triassic.				+					+					+					
Palæozoic.	Permian.							+	+											
	Carboniferous.					+														
	Devonian.			+																
	Silurian.		+																	
Archæan.		+																		

CHART V—Successive Appearance or Origin of Organs

Geolog. Period of Appearance.	Stages.	Digestive System.	Reproductive.	Muscles of—				Excretory System.	Circulatory System.	Breathe by Means of—	Nervous System.	Mental Powers.
				Trunk.	Legs and Arms.	Hand.	Fingers.					
?	Protozoa.....									Surface of Body.		
?	Cœlenterata.....	*	*									Sense Perception.
Arch.	Worms.....	++	++	*				*	*	" or Gills.	*	"
Pal.	Fish.....	++	+??	++				+	++	Gills.	++	"
Pal.	Amphibia.....	+	—	+?	*			+	++	Gills and Lungs.	+	"
Pal.	Reptiles.....	+	—	—	++			+	++	Lungs.	++	"
Mes.	Lower Mammals...	?	—	—	++			+	++	" ++	++	Intelligence.
Mes.	Arboreal M.....	?	—	?	++	*	*?			"	++	"
Cen.?	Prim. Man.....		—	?	+	++	++			"	+++	Moral and
Recent.	Civilized M.....		—	—		++	+++			"	+++	Religious.

STAGES.	Most Important Part of Brain.	Organ Approaching Culmination.	Most Rapidly Advancing Organ.	Dominant Function.
Protozoa.	—			
Cœlenterata.	—		Digestive and Reproductive.	Reproduction.
Worm.	—	Reproductive.		"
Fish.	Midbrain. Cerebellum.	Digestive.	Muscles.	Locomotion.
Amphibia.	"		"	"
Reptile.	Cerebrum?		"	"
Lower Mammal.	Cerebrum and Cortex.	Muscle.	Muscle. Brain ?	"
Arboreal Mammal.	Cortex.		Brain. Hand.	"
Primitive Man.	Association areas of Cortex.		"	Mental.
Civilized Man.			"	"

FUNCTIONS OR POWERS

Dominant Mental or Nervous Action.	Sequence of Perceptions.	Sequence of Motives.	Environment Makes for—	New Attainments or Contributions.
	Touch and Smell.	Hunger.		The cell.
	"	"	Digestion and	Digestive and reproductive organs.
Reflex.	Sight.	"	Reproduction.	Vital organs, Trunk muscles.
Reflex ? Instinct.	"	Hunger. Fear ?. Anger ?	Strength	Backbone ? Jaws. Brain.
"	Smell.	"	and	Backbone ? Jointed Legs. Lungs.
"	"	"	activity.	Cerebral cortex.
Intelligence ?	Smell. Sight. Hearing.	The above and other prudential Considerations.	" and Shrewdness.	Placental Development.
Intelligence.	"			Hand.
"	"	"	"	Personality.
Reason.	Reason.	Truth and Right.	Righteousness.	

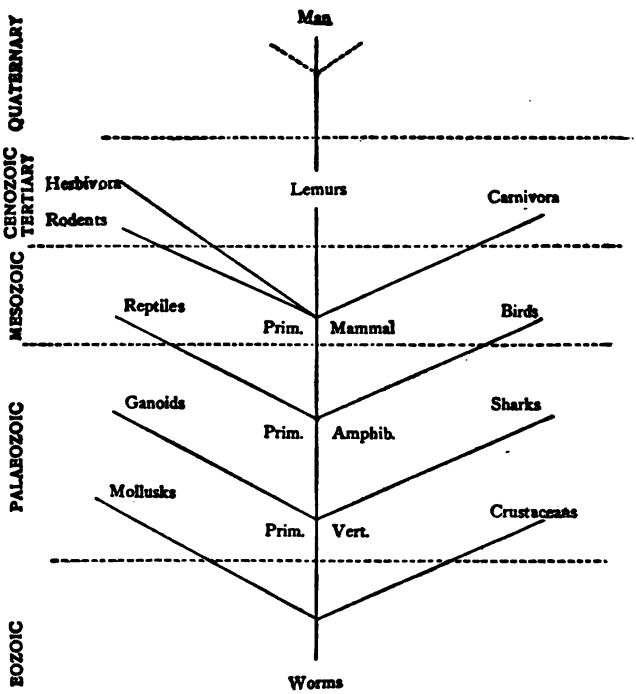

Chart VII. The Survival of the Fittest.

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